American Artisan

THE WARM AIR HEATING AND SHEET METAL JOURNAL

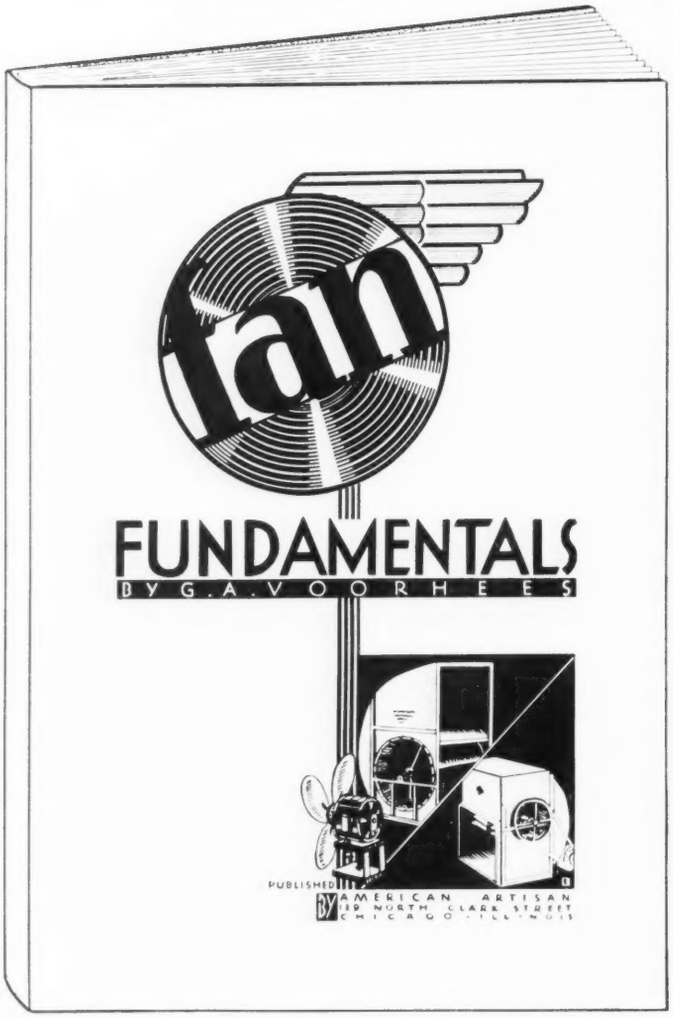
FOUNDED 1880

St. Pascal's Church, just being completed in Chicago, is ornamented and protected with lead-coated copper stamped and fabricated in keeping with the Romanesque style of architecture. Gutters, conductors and conductor heads are highly interesting examples of the versatility of metal in the hands of expert artisans. The metal application has been enthusiastically commended by architects and church authorities. Details of the work are contained in this issue

DECEMBER 7, 1931

This NEW Book on

"FAN FUNDAMENTALS"



Only $1.00

Read this Table of Contents
Ten Chapters

Frictional Resistance in Heating Systems
How Location Effects Fan Efficiency
Booster and Pressure Type Fan Systems
Static Pressure
Construction and Operation of Propeller Fans
Construction and Operation of Centrifugal Fans
What Fans Can and Cannot Do
Sources of Noise in Fan Installations
How to Determine Fan, Pulley and Motor Speeds and Sizes
Typical Fan Problems and Their Solution

WHAT OTHERS THINK OF THIS BOOK

A Contractor says:

"Mr. Voorhees surely makes things very clear and if it had been my privilege to have had this book some years ago, it would have saved me time, grief and money." A. J. Nydam, Nydam & Cole, Grand Rapids, Mich.

An Engineer says:

"I was just glancing through the book and I am sure it is a very valuable piece of literature and feel positive this is something that a good many engineers and contractors in the Forced Air Heating Work will be able to make valuable use of."

A Manufacturer writes:

"The Articles contained in the booklet are indeed very interesting and instructive, and will be useful to the writer."

MANUFACTURERS

This book makes an ideal gift to present to your salesmen or contractor customers at Christmas time. You can buy them in quantity lots at discounts. Send for a copy for examination. Write to address below on your business letterhead.

CONTRACTORS
Read This Money-back Guarantee

While this book is cheap at the price of one dollar you have the privilege of examining your copy and if for any reason you are not satisfied that you made a good investment return the book in 10 days after purchase and your money will be refunded.

Mail the Coupon Below—if you wish a copy

The Reservation Coupon gives you an opportunity to get one of the very first copies to come off the press. Merely clip and mail coupon with $1.00. The edition of this booklet is necessarily limited, so to avoid disappointment we urge you to act immediately.

Cash Must Accompany Order—CLIP AND MAIL THIS COUPON

Book Department
AMERICAN ARTISAN
139 North Clark Street
Chicago, Illinois

Here is my remittance of $1.00 for book entitled "Fan Fundamentals." Mail copy postpaid immediately to:

Name

Street and Number

City and State

ALS"

.00

Contents

rs

ting Systems
Efficiency
Fan Systems

of Propeller Fans
n of Centrifugal

Do
tallations
Pulley and Motor

Their Solution
THINK OF
K

ngs very clear and if
e had this book some
me time, grief and
Cole, Grand Rapids,

e book and I am sure
erature and feel posi-
good many engineers
ir Heating Work will
."

e booklet are indeed
e, and will be useful

TORS

k Guarantee

at the price of one
lege of examining
reason you are not
good investment re-
after purchase and
ed.

come off the press.
ed, so to avoid dis-

PON

"Fan Fundamen-

On Your Job

WHAT do you need in your job—exceptional forming qualities, higher finish or a coating that stands the gaff of fabricating without damage? Every job has its particular problems. And the Granite City Steel Company provides a classification of steel to meet these various needs—better. Through 53 years of service in hundreds of different uses and through constant and rigid laboratory test, the Granite City Steel Company is able to offer quality and performance standards that invite the most exacting comparison. And the location of the Granite City Steel Company, just 20 minutes from Saint Louis, served by 29 railroads and the Mississippi River, assures better service to the Mississippi Valley, the West and the Southwest.

Chicago, Dallas
Kansas City
Los Angeles

St. Louis, St. Paul
San Francisco
Salt Lake City

GALVANIZED SHEETS
STEEL SHEETS
PLATES AND
TIN PLATE

•

GRANITE CITY STEEL CO
GRANITE CITY, ILLINOIS

Founded 1880

American Artisan

THE WARM AIR HEATING AND SHEET METAL JOURNAL

Covering All Activities
IN
Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Industrial Roofing
Merchandising
Ventilating

Member of the Audit Bureau of Circulations

VOL. 100, NO. 25

DECEMBER 7, 1931

The article on Fan Blast Engineering by Platte Overton, published in this issue, concludes the series planned for this year. That his articles have been read with much interest and with some profit we have no doubt. Nevertheless, an expression from readers on these articles, whether they want them continued, if so, what they would like to see discussed, will greatly aid us in planning next year's editorial program.

Will you let us hear from you?

* * *

The article in this issue telling about the operations of Loren Cox should prove of interest. This man has taken a system as old as warm air heating and adapted it to present day conditions in the household heating field. That there is the germ of an idea and a good one we have no doubt. Perhaps you will be interested enough to express an opinion.

* * *

One of the most unusual things occurring this year is the response to the problem of the heat robber. Seemingly every heating man has his own pet robber and is anxious to tell the world about it.

Contents

Page

Business Needs Every Man's Support 9
The editorial.

St. Pascal's Ornamented in Stamped Copper 10
An unusual and interesting application of stamped lead-coated copper in gutters, conductors and conductor heads on a Romanesque Chicago church.

Cox Has Developed a "High Efficiency" System 14
Loren Cox, who operates in Wichita, Kansas, has developed a unique system for heating houses with gas. This story tells how the system is designed and how it works.

More Solutions for That Heat Robber Problem 17
Continuing our heat robber problem we publish more solutions submitted by readers. And still the answers come in.

The National Warm Air Heating Association Convention 20
A report of the business transacted and recommendations made at the winter convention. Important addresses and papers presented are also reported in brief.

A Single Pitch Skylight 23
W. R. Haines, Contributing Editor, works out the patterns for a skylight requested by a reader. If you have a shorter or better way to make this skylight, let us hear from you.

Fan Blast Engineering 24
Platte Overton concludes the short series of articles answering a query given him several issues ago.

Can You Tell Me? 26

New Items and News Items 28

JOSEPH D. WILDER
Editor

Published Every Other Monday

Copyright 1931 by

PORTER-SPOFFORD-LANGTRY CORPORATION
139 North Clark Street, Chicago—Telephone Central 7670

Fred D. Porter, *President* John C. Langtry, *Vice-President* Howard H. Bede, *Secretary*
Circulation Manager: John R. Hannon *Business Manager:* Etta Cohn *Advertising Representative:* Charles E. Kennedy
New York Office: 295 Madison Avenue, Room 1109, *Tel. Ashland 4-5342*—L. R. Hudson, *Eastern Representative*
Yearly Subscription Price—In United States, $2.00; Canada (including duty), $4.30; Foreign, $4.00; Single Copies, $.25

Entered as second-class matter, January 29, 1930, at the Post Office at Chicago, Illinois, under the act of March 3, 1879. Formerly entered on June 25, 1887, as American Artisan and Hardware Record

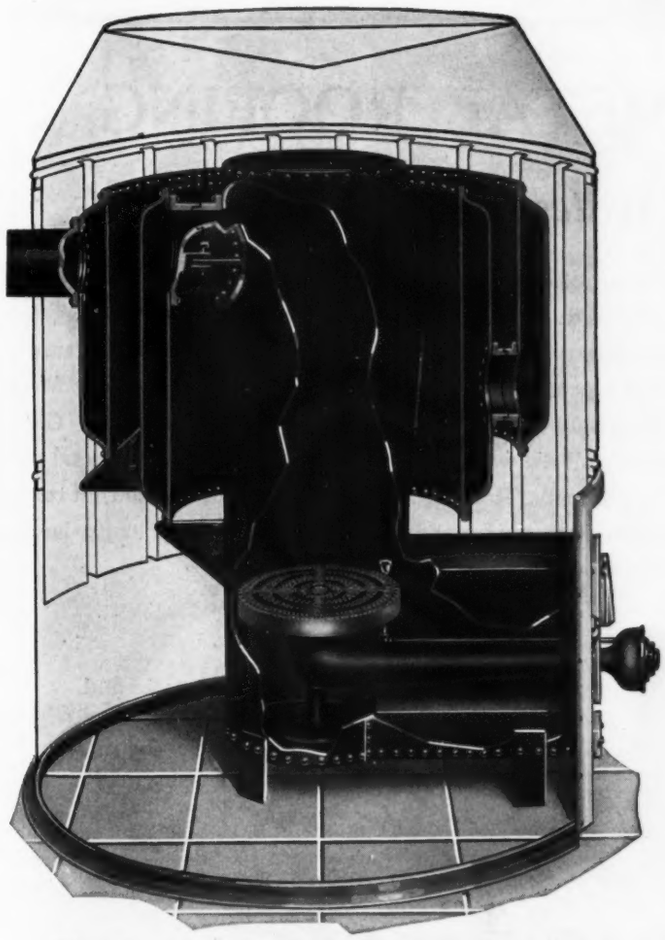
A New Idea In Gas Furnaces!

Here is a gas furnace which combines simplicity, unusual durability, absolute safety, high efficiency and great heating power all in one good looking and very reasonably priced furnace.

Heavy (No. 14 gauge) copper bearing boiler plate steel is riveted and calked at every seam to insure pressure-tight, leak-proof construction. The two large cylindrical radiators, one inside the other are formed in special rolls so only one riveted seam is necessary top and bottom. This forming process adds rigidity and eliminates all traces of expansion and contraction noises which are usually found in gas furnaces of the steel construction.

This new Equator is one of the lowest priced gas furnaces on the market today. It is far lower in price than any other gas furnace of similar weight, durability and efficiency.

The EQUATOR GAS FURNACE



Fitted with either round or square casings

The cutaway view here shows that the generous combustion chamber extends to the full height of the furnace. Two large cylindrical radiators (extra heating drums) completely surround it.

There is practically twice as much heating surface per B.T.U. of input as in other gas furnaces. Long gas travel combined with such a tremendous area of heating surface, and the concentric construction, assures positive heat and high efficiency.

This gas furnace is made in four sizes ranging from an input of 100,000 B.T.U.'s to 180,000 B.T.U.'s. All sizes are approved by the American Gas Association.

There is a great deal more to the story of this wonderful gas furnace. Write us for further information.

Those who have seen the Equator and have learned of the low prices tell us that it is the greatest thing in gas furnaces today.

LENNOX FURNACE COMPANY, INC.,
MARSHALLTOWN, IOWA **SYRACUSE, NEW YORK**

THE METAL

. . . *that's the Vital Thing!*

GLOBE TRADE MARK BRAND

METAL ROOFING

Creates Reputation . . . Profits

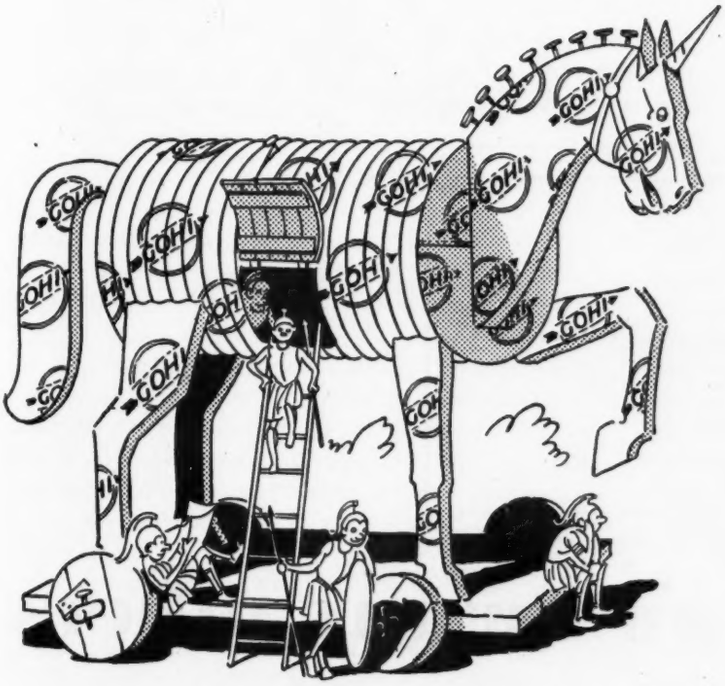
YOUR reputation as a sheet metal contractor can be no better than the metal you use. Every job speaks for you — or against you — according to the service it gives your customer. Make sure of good will and repeat business by using **GLOBE BRAND** Sheet Metal Building Materials. Globe quality never varies. The reason — Globe control extends all the way back to the manufacture of the metal that goes into its products. This control is vital. It means metal that resists corrosion and deterioration; that gives your customer a longer-lasting job — builds reputation for you.

SHEET METAL Building Products

Globe Roofing in all approved styles and sheet metal products for every building need are carried in large stocks for immediate shipment.

The Globe Iron Roofing & Corrugating Company
Cincinnati, Ohio

Ancient Trojan Horse was built of GOHI



Hieroglyphics on ancient Greek tablet of stone, recently discovered by Professor Dinkelhoffer I. A. A. L., in his back yard, show that famous Trojan Horse was not made of wood at all, but of GOHI.*

Tablet deciphered, reads:

"Because posterity will sing of the deeds of Achilles, Odysseus, and the other famous heroes at the seige of Troy, the Trojan Horse is to be made of GOHI. This horse must last until 1931. Furthermore, as you bums are more fond of fighting than of work, the great ductility and ease of handling of GOHI (pronounced go-high) make this metal ideally suitable."

(Signed) Agamemnon
King of Argos and Generalissimo of the Greeks
**I am a Liar.*

THOUSANDS of manufacturers, architects, artisans, and contractors throughout the country are also discovering the definite superiorities of GOHI.

GOHI is pure iron alloyed with just the right amount of copper. It is this analysis that makes GOHI the one, safe, dependable sheet metal for use where time, wear, and weather lay a heavy hand.

This perfect alloy of iron and copper not only assures long life, but also a metal structure that is uniform, dense, homogeneous, soft and ductile.

GOHI is twice economical — economical because of the length of service, economical because of the ease of fabrication. Specify it wherever you have a need for sheet metal.

THE NEWPORT ROLLING MILL COMPANY, Newport, Ky.

GENUINE OPEN HEARTH IRON — GOHI — TRADE MARK — PURE IRON - COPPER ALLOY — REG U.S PAT OFF.

IT'S THE PURE IRON, ALLOYED WITH THE RIGHT AMOUNT OF COPPER, THAT GIVES GOHI ITS LASTING QUALITIES.

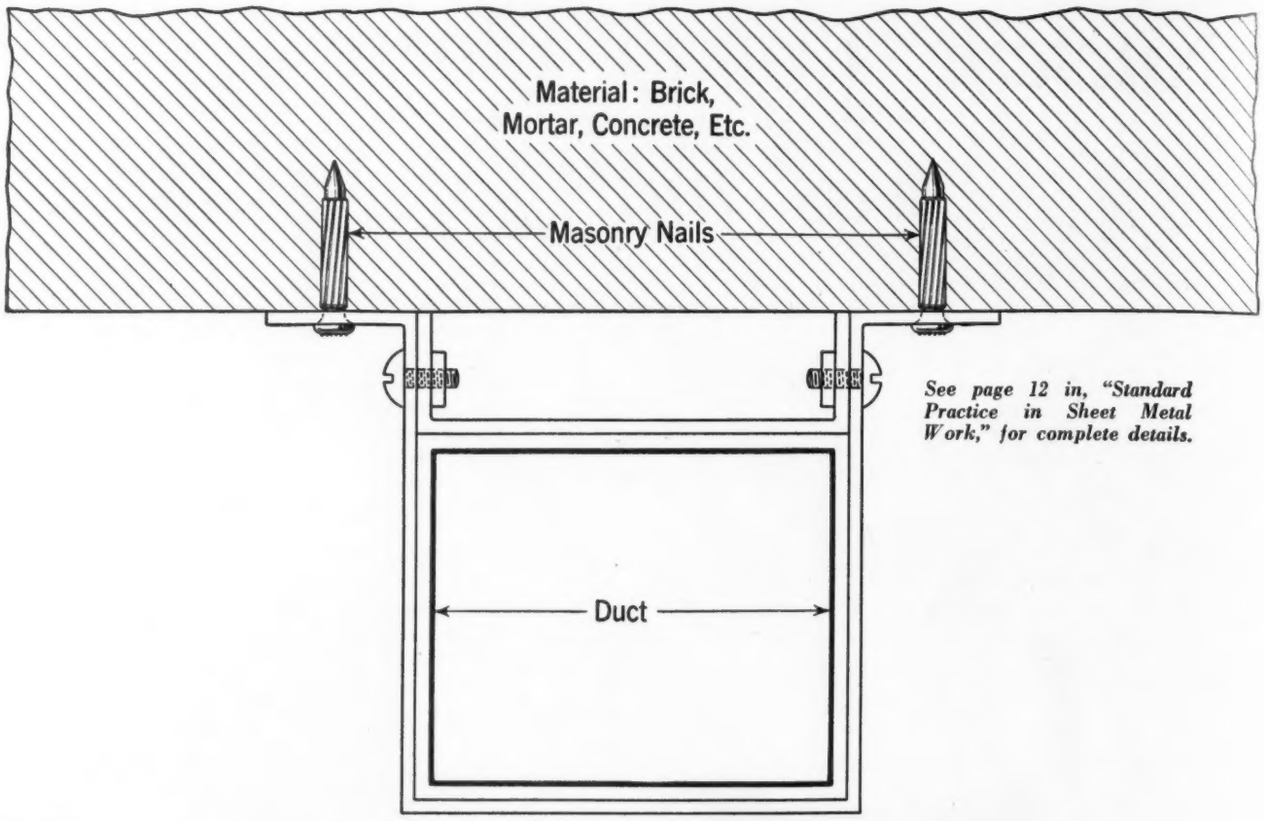
GOHI

PRONOUNCED "GO-HIGH"

SHEET METAL

Write for the name of the Gohi Distributor near you

Say you saw it in AMERICAN ARTISAN—Thank you!



See page 12 in, "Standard Practice in Sheet Metal Work," for complete details.

For this job and many others

your **TRADE DEVELOPMENT COMMITTEE** *indicates*

. . . the modern, simpler means of making fastenings to brick and masonry

Look through the 768-page reference book, "Standard Practice in Sheet Metal Work," compiled for your use by The Trade Development Committee of The National Association of Sheet Metal Contractors. This helpful volume indicates the use of Hardened Masonry Nails for many of your jobs.

Use Masonry Nails whenever you can. They were designed, like other Parker-Kalon fastening devices, to help the sheet metal worker get more profit from his work. They save a great deal of time and labor. And they do it without sacrificing good work.

Thousands of sheet metal workers know Hardened Masonry Nails as the modern, simpler means of making first class fastenings to masonry at lower cost.

Drive Hardened Masonry Nails into mortar and cinder blocks just as you drive common nails into wood. In harder materials, such as brick and seasoned concrete, you merely drill small starting holes for the Nails. Try them! *Send the coupon for free samples,* and see how much easier, quicker and cheaper you can make fastenings with Hardened Masonry Nails.

PARKER-KALON *Hardened* Masonry Nails

PATENTED -No. 1485202

Parker-Kalon Corporation, 190 Varick Street, New York, N. Y.
Send me free samples of the products checked. ☐ Masonry Nails. ☐ Screwnails. ☐ Sheet Metal Screws.

Name and Co.....

Address .....

Hardened Screwnails
For securely fastening sheet metal to wood. Drive easier. Hold four times better than ordinary nails.

Hardened Self-tapping Sheet Metal Screws
The easiest, cheapest means of joining sheet metal and making fastenings to sheet metal.

Mention AMERICAN ARTISAN in your reply—Thank you!

Volume 100

American Artisan
THE WARM AIR HEATING AND SHEET METAL JOURNAL

Number 25

Business Needs Every Man's Support

THE warm air heating and sheet metal industries do not constitute, by and large, one of the commonly recognized "big" industries of the country. Neither do they constitute, in popular opinion, one of the basic industries upon which depends prosperity and progress.

Nevertheless, these two allied industries when bulked together as manufacturers, jobbers, contractors and workmen, do constitute an important line of industrial activity. These industries should, then, take an active interest in the programs being devised to alleviate unemployment, personal and family suffering, and hasten better times.

During the many months the present depression has been in full sway, hundreds of programs designed to provide relief have been proposed. Many of these were entirely impractical, others required ponderous machinery and others could not arouse public support.

The whole situation has seemingly now narrowed down to a program designed to break the vicious circle of lost job, curtailed income, decreased buying power, from individual to retailer, to wholesaler to manufacturer and back to the individual. At just which point on the circle the first break will come remains in doubt.

There are, however, a number of sound ideas recently advanced by the President's Committee on Unemployment which deserve support, not for political reasons, but because they are elementary in reasoning, structure and results.

This committee recommends that so far as possible young men be kept in school. Keeping young men in school serves two purposes—gives more young men good educations and removes from industry the young man who can and is replacing the older man who requires and gets more money. All through our industries the older man who has a family, probably his own home, who is an established figure in his community should be kept at work. Substituting younger men at reduced wages for the older man who gets more money is a short sighted policy.

Spread labor is something difficult to apply to our industries outside of the manufacturers and shops employing a number of men, but sound reasoning would indicate that men working three days alternately means a wider buying power than five men working a full week. Certainly the half time work eliminates luxuries, but means more money to be spent on necessities and keeping out of debt and leads to slow, but sure, return of steady work.

Every man connected with our industries should be interested in hastening public work. The delay since public work was first suggested months ago has been due in a large measure to unsound plans by communities already far in the red and by political horse play. There are, nevertheless, hundreds of needed public improvements in cities able to pay and such programs should have our hearty support.

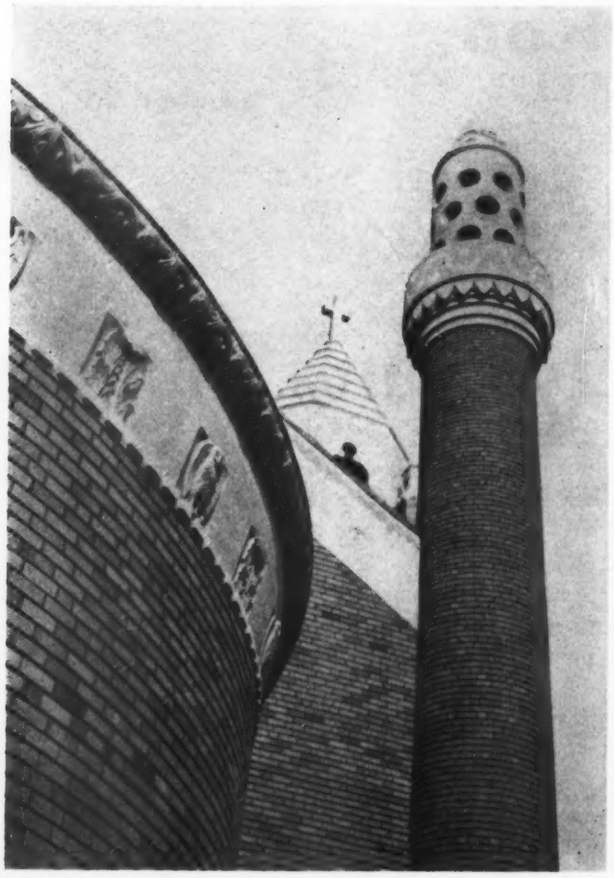
Community programs to alleviate poverty and promote work among home owners ought to be unanimously supported. Of course, many people still employed are living on reduced incomes, are supporting relatives out of employment and so forth, yet there are and should be a volume of small jobs available if they are only pointed out.

Another item we should all work for is better credit operations. Credit effects every one of us. Bankers, according to the committee, should broaden their views. They should give more weight to intangibles and be lenient in calling loans and commitments. Easier credit will ease the whole situation.

We all can remember last winter's slogan, "Buy Now." For this should be substituted "Buy Normally." By normal buying is meant steady buying. The dollar in most lines of sales has increased in buying power up to 25 per cent. People get more for their money and in the building and contracting field undoubtedly better workmanship and more for the labor dollar. Many economists state that this situation is not stable and that prices will rise. The salesman of combined material and labor is using this as a talking point. Our industries can also use this as a lever for getting contracts signed.

Everyone in these fields — manufacturer, jobber, contractor—is selfishly interested in seeing better times. Undoubtedly most of us have gotten over the ideas that good times would return with a bound and acquiesced to the idea that better times are coming slowly but surely. Even though our industries are not major or basic, business needs everyone's support and we should do our bit.

St. Pascal's—A With Stamped



The gutter around the apse eave is stamped in lead coated copper. Straps are used under the gutter and across the top. The deep stamping is as visible as this from the point of photographing—about 35 feet

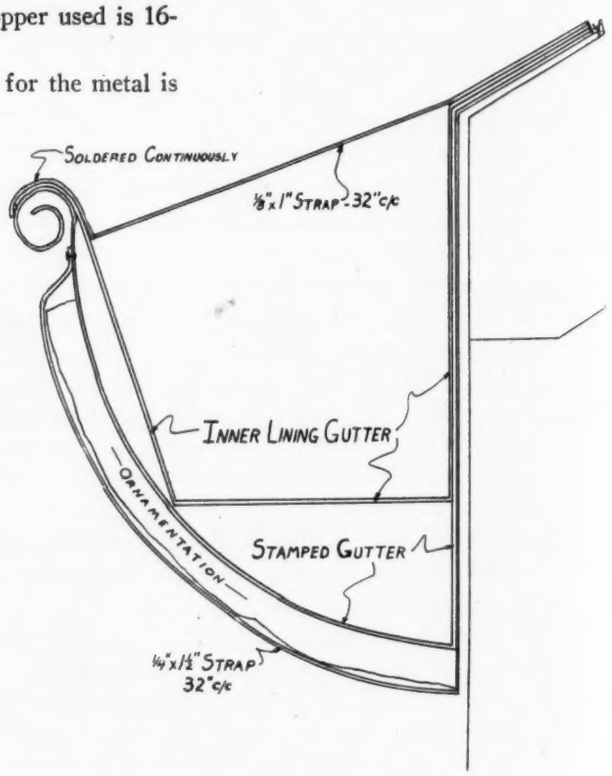
THERE is just being completed in Chicago a lead coated copper installation involving several interesting features of fabrication and erection. This installation is being made by Wagner Brothers, a firm whose operations extend back some 40 years. The structure is the new church of St. Pascal's on the far northwest side of the city.

The new church is a brick structure of Romanesque architecture designed by B. J. Hotton and Raymond Gregori, Associated. The style of architecture features ornamental window insets in the walls and deeply stamped metal work.

The metal work consists of specially stamped gutters along the eave of the side aisle walls, similar gutters around the eave of the apse, stamped gutters along the eave of the nave roof and conductors and conductor heads stamped with a design corresponding with the design of the gutters. In addition, there is a large quantity of lead coated copper used for flashings, in ventilation louvres, some plain copper in gutters and flashings on the arcade connecting the church with the rectory, and a small quantity of sheet lead used for protection at exposed positions on the tower and belfrey. All the copper used is 16-ounce.

The design used for the metal is called a "Romanesque" design and consists of a running design of grape leaves on a stem with dragons inserted at intervals along the vine.

One of the most interesting features is the fabrication and erection of the gutters. The gutters consist of two styles, one used along the nave roof eave and the other along the eaves of the side aisle walls and transept. The stamped design is the same on both gutters. The gutters were received in the Wagner shop in 8-foot lengths of flat sheet. The stamping was done by Friedley-Voshardt of Chicago. The Friedley-Voshardt company prepared a special die and the 8-foot sheets were run through this die in shifts. When the sheets were received in the Wagner shop they were put in the brake and formed into the three types of gutter used.



This detail shows a cross section of the gutter used around the apse. Note how the inner liner gutter is placed and where solder points are made. Both outside and inside straps are used for rigidity. The liner is pitched two ways from the half way point between drains

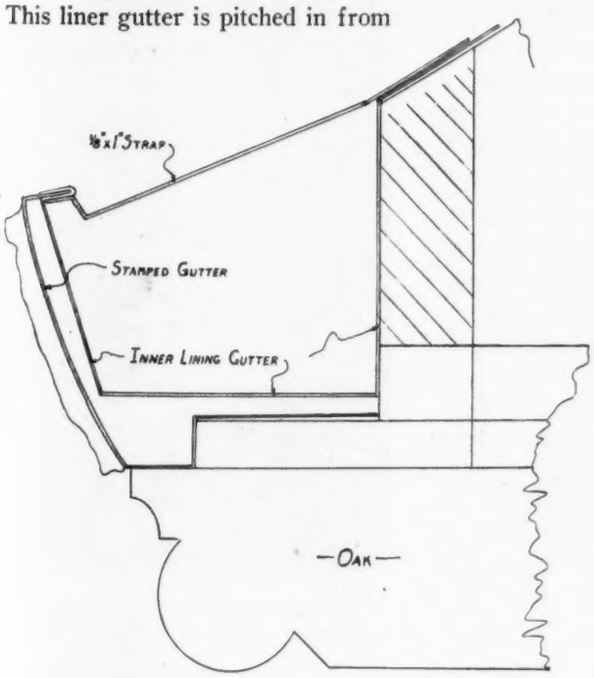
Romanesque Church Ornamented Copper Conductors, Heads, Gutters

The stamping work on the conductors was made by Friedley-Voshardt in a similar manner, excepting that the sheets were stamped in 7-foot lengths. The conductor sheets were also sent to the contractor flat. The sheets were stamped and cut to allow a 2-inch lap between sections.

The gutter along the nave eave and the gutter around the apse is of the round hanging type. This gutter was formed with a bead edge to which was riveted supporting and brace straps and to which was soldered the outer edge of the liner gutter which is also lead coated copper.

In the erection of these sections of round gutter there are two features of importance. These are the straps used and the inner lining. These gutters are quite deep and too large for the amount of water to be drained between the conductors. Inside these gutters, therefore, a special liner was soldered. This liner gutter is pitched in from the front bead, crosses over the bottom and up the back side and over the roof as far as the outside gutter is carried. The entire length of the edge at the gutter bead is soldered continuously for rigidity. The bottom is not soldered, but a spot solder point is made about half way up the back side. The false bottom slopes both ways from the half way point between heads to the heads.

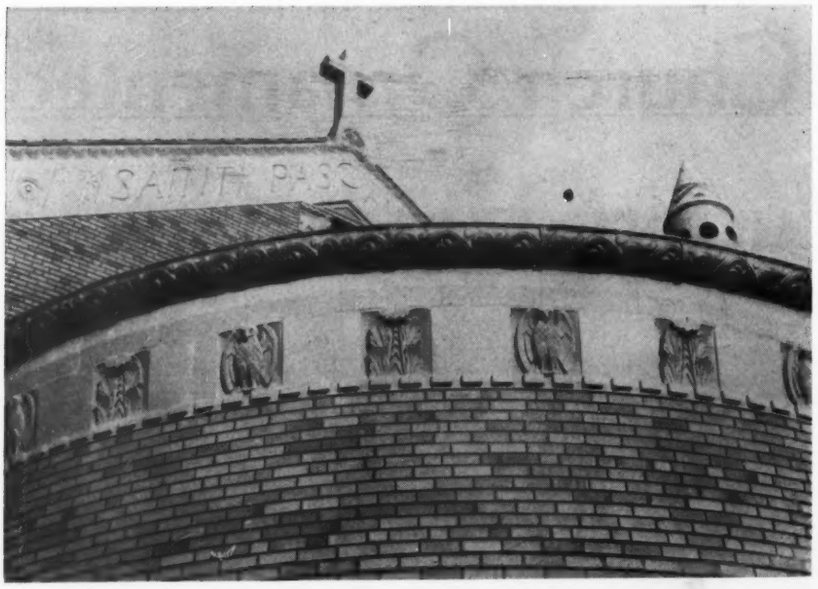
Above are shown the two types of conductor heads and the two types of eave gutter. The lower head was furnished plain with separate rosettes while the upper heads were stamped by the Friedley-Voshardt company



This is the gutter used on the side aisle eaves. The face is a flat arc with an inner liner gutter for protection. Only top straps were used as the projecting rafters support the gutter

Around the outside of the gutter a ¼ by 1½-inch strap hanger was carried from a point just below the bead under the bottom and up the back side and onto the roof. These straps were placed on 32-inch centers. At the half points between these outside straps, brace straps were brought from the bead across the top of the gutter and onto the roof, where they were fastened. All strap used on the building are lead coated brass.

The construction of the inner liner and the heavy straps was made to insure rigidity under the worst



Another view of the round, hanging gutter around the apse. The ornamentation is Romanesque corresponding with the architectural style of the building. Straps are centered over the panel insets

possible conditions of snow or freezing. Adequate provision is made in the construction for expansion.

The gutters of this type were erected in various lengths on the job. Some sections were handled in lengths of 16 feet, others in 20, 24 and one of 29 feet, depending on the breakup between conductor heads. In all there were 264 feet of this type of gutter.

The gutters along the eave of the side aisles is of different construction. This gutter has a rather flat arc face with the bottom concealed behind heavy wood brackets and wood framing between brackets. The wood paneling is horizontal and extends out flush with the bottom of the stamped face. One of the details shows how this gutter was fabricated and placed. The face of this gutter, being close to the ground, was not broken by exterior straps. Back straps similar in size to those on the nave gutter were used and turned into the stamped face as shown in one of the details. In this gutter an inner gutter lining similar to that on the other gutters was used and again pitched between heads. Soldering was continuous along the outside edge with spot points along the back side.

The gutter along the eaves of the transept is identical with the gutter of the side aisles except that the roof pitches at a steeper angle and the under wood framing of brackets and panels is pitched with the roof instead of being horizontal. These gutters have a shallower depth from face to back with a cross section as shown in one of the details. In these gutters an inner liner gutter, fabricated and erected like the liners previously described, is used.

There are some 450 feet of stamped gutter used on the side aisles and the transept.

The gable walls of the transept are ornamented with a flat stamping having the gutter design.

The conductor heads are of two types. The heads used on the nave walls were stamped faces with stamped moldings and plain sides and back and were formed in the Wagner shop from flat sheets. The pendants were made by hand by Wagner artisans and attached during the forming process. The heads on the side aisle walls were made in plain sheets with stamped rosettes soldered on at the same time the pendants were put on. There are 17 heads in all—9 of the stamped face type and 8 of the attached ornamentation type. The general design of the heads can be seen in the photographs.

On the building there is 450 feet of downspout. All of this downspout has a stamped face corresponding to the ornamentation of the gutters. The conductors were again stamped and received in the flat, formed in the brake and seamed with soldered points on about 12-inch centers. The flat sheets came in 7-foot lengths with about 2 inches allowed for joining.

The heads and conductors are held out from the wall 1 inch by

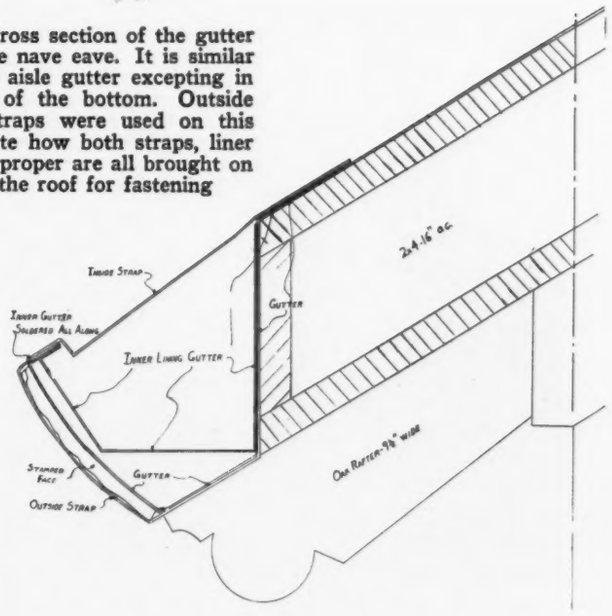
This closeup shows the stamped conductor pipe and conductor head. The ornamentation on the head was furnished separately

special bands which are again stamped with the design. The bands were also received in the flat, corners were cut and soldered in the shop and sent to the job completely formed.

Special lead coated copper flashing and counter flashing was used in many places on the building. The ridge of the side aisles is flashed, so is the deck or the choir, the roofs of the transept and the connecting buildings. In addition there is quite a bit of sheet lead and copper sheeting used in protecting the deck and the eaves of the belfry and the tower.

The Wagner contract also included the tile roof. This tile is laid on "Nailcrete," precast on the nave roof, poured in place on the side aisles and transept. There is some 165 squares of tile of Ludowici-Celadon manufacture. The style of tile is known as Imperial Spanish in a full variation of color. This consists of 25 per cent red, 25 per cent fire-flashed, 25 per cent ancient and 25 per cent sage brown. The tile were fastened with 2-inch copper nails on the side aisles and transept and 1¾-inch nails on the nave.

This is a cross section of the gutter used on the nave eave. It is similar to the side aisle gutter excepting in the shape of the bottom. Outside and top straps were used on this gutter. Note how both straps, liner and gutter proper are all brought on top of the roof for fastening



The Wagner company will have galvanized iron work on the organ ducts when this part of the church gets under construction.

Employment Plan to Aid You

AN encouraging announcement has been received from the editor of *The American Home,* popular household magazine, stating that the magazine has inaugurated an Employment Plan designed to stimulate repair and remodeling construction throughout the country.

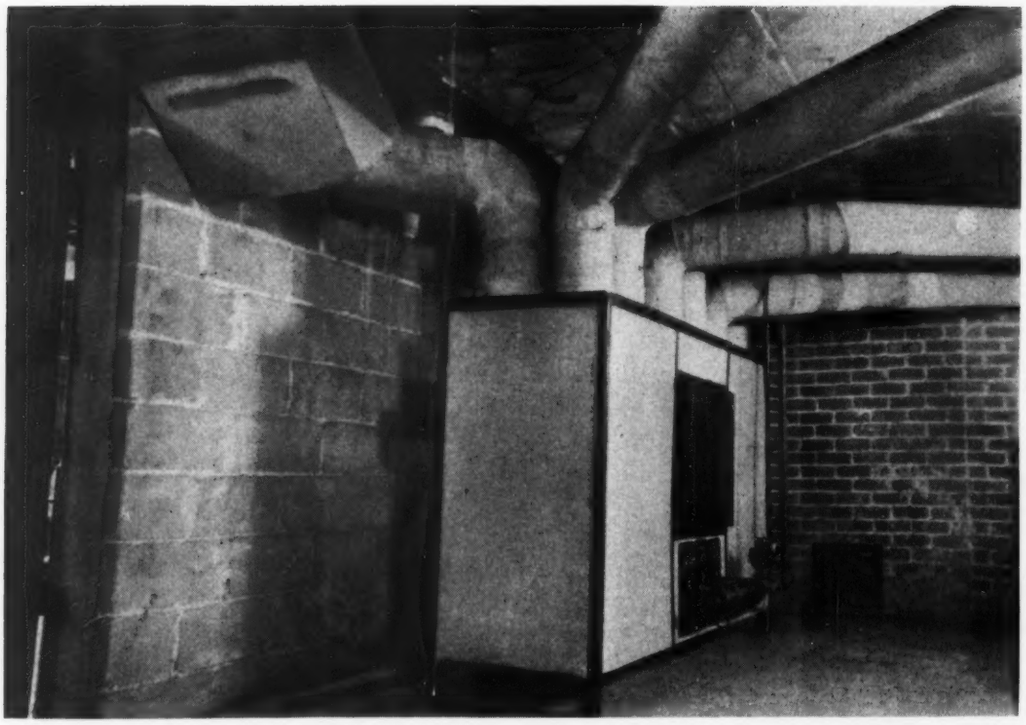
The plan is based upon a monthly feature in article form telling home owners that now is the time to remodel and repair and giving them a checking list showing 100 suggestions for work which can be done before winter sets in.

Each issue of the magazine will carry a detailed list of 20 items which are timely. The first list, contained in the November issue, gives among the 20 suggestions the following items to be handled by our industries:

Repair or replace gutters, leaders, or flashings. Carefully examine the wood or metal gutters and leaders and, if possible, inspect the flashings in valleys or around chimneys on your roof. If rusted or decayed, consult your local tinsmith or sheet metal worker or roofing contractor about repairs or replacement. You will thus prevent possible damage through leaks during the winter. At the same time consider using more durable metals that will never need replacement.

Clean chimney flues; clean out ash pits; repair flue connection; reset or clean out furnace and boiler. This work should be done to every chimney and heating plant at the beginning of the season. If you have not taken care of it this year, it can still be done on a mild day when the fires are banked. A chimney sweep can clean the chimney; or better still employ a heating contractor equipped with a vacuum chimney and furnace cleaner to put the entire system in perfect condition.

Convert hot air heating plant to modern forced air circulation system for better heating, with automatic humidification. "Gravity" hot air heating plants that have ducts and registers serving separate rooms (those that are not one-pipe heaters) can be modernized in any one of three ways: (a) Install in the cold air return duct near the furnace a fan made especially for this purpose which will force the circulation of air more rapidly to all parts of the house and will thus increase efficiency, especially in the cold rooms. This is work for the local heating contractor or sheet metal worker. (b) Install in the casing of your existing furnace any one of several modern types of water evaporators or humidifiers with an automatic water supply connected to the cold or hot water line. This will moisten the air and create more healthful conditions. Consult heating contractor who can supply equipment and make the installation. (c) Replace old furnace with a modern unit containing its own blower and humidifying device. May be gas, oil, or coal fired. Secure data from the dealers in modern furnaces and air conditioning heaters.



This is a replacement "high efficiency" with a furnace of 240,000 B.t.u. capacity. Note the cut-off return in the upper left corner. The entire furnace room acts as a return air room

Cox of Wichita, Kansas Has Developed a "HIGH EFFICIENCY" SYSTEM

AT one time or another probably every warm air heating contractor has visualized the kind of furnace he would build if he had the necessary equipment, capital and time.

And in most cases this idea remains only an idea because all three factors never seem to get together at one time and also because manufacturers' products are cheap, better and easier to sell.

But in Wichita, Kansas, there is a heating contractor who has brought together these three factors of time, money and equipment and has experimented with a furnace which fits into a special heating system requiring a furnace different from manufactured articles.

This contractor is Loren N. Cox and his business is known as the Loren N. Cox Furnace Company. In the territory where this contractor operates the fuel most commonly used is natural gas, for throughout this part of Kansas gas is both abundant and cheap.

The Cox company has been in existence in Wichita for a number of years. When natural gas was first introduced Mr. Cox was one of the first to design and install gas-fired warm air systems and throughout the years has been markedly successful as a designer and installer of good furnace plants.

In Mr. Cox's own home he has experimented with the different pieces of new equipment which were placed on the market. Early in the gas heating era he also began to put in his basement every gas furnace on the market. Between the time he installed the first gas furnace in his basement until he had designed his own furnace he experimented on more than 18 makes of furnaces. His purpose in trying out all these furnaces was to find one which could be incorporated in his system.

The furnace proper is, however, only a minor part of this story. The real story has to do with the system of heating which was worked out while his furnaces were being developed. This system is simplicity itself. It pretends to nothing new or unique for it is, in fact, a return to some of the systems in vogue forty years ago. There is, however, the difference that where the system as used forty years ago was extremely dirty, the system used with the gas furnace is

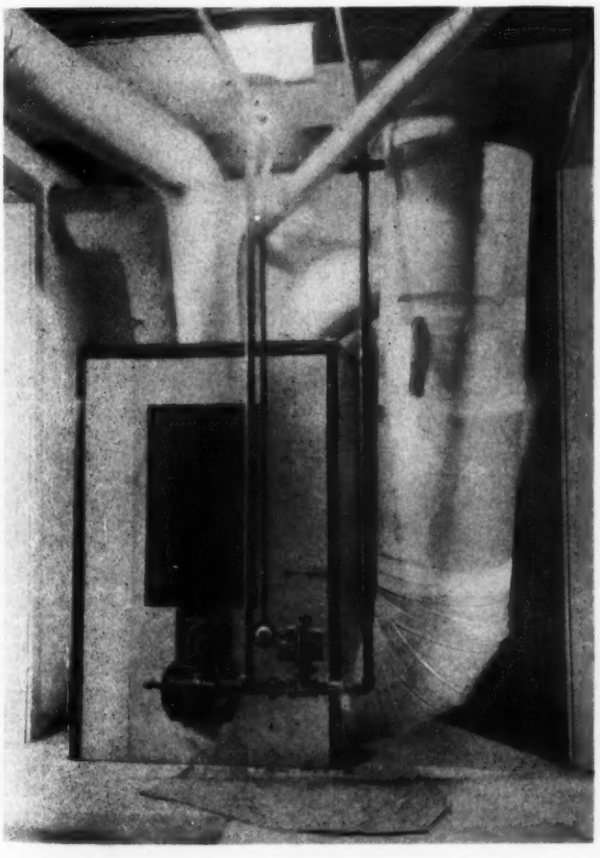
clean, easy to install, low in cost and efficient.

Mr. Cox calls his design the Cox High Efficiency System. It consists of the usual warm air supply, but for return air depends on grilled openings through the floors into the basement. There is no return duct system excepting where the basement is very large, has dirty or dusty rooms, or is blocked off by partitions. In such a case the grilled opening is connected into a joist space lined along the bottom and continuing through the wall of the furnace room where the duct is abruptly cut off with no direct connection to the furnace.

To fit this system, the Cox gas furnace has all four sides of the casing cut above the floor line so that basement air can enter the casing space from all sides. With this system the heater room or the entire basement can and does become a cold air chamber with the coldest and heaviest air lying next to the floor.

Such an arrangement would be impracticable with any kind of fuel requiring hand firing. The home owner must, of course, be impressed with the idea of keeping the basement clean. Some tests conducted in the Cox experimental basement disclosed that this matter of basement dirt is not quite as serious as it might appear. With cubic areas as large as a furnace room or the entire basement, the pull of air rising through the furnace casing exerts only a very slow pull on the mass of air inside the room or basement. The movement is so slight that dust which is not agitated settles out and dirt heavy enough to ordinarily fall to the floor is too heavy to be picked up by the air current.

This house is typical of the 1931 construction into which speculative builders are placing Cox's equipment



These two heaters are in the house shown above. Each unit serves a part of the house. In this house direct returns are used because of the location of the units

As can be imagined this elimination of the usual return air duct system reduces the cost of the installation considerably. Elimination of the ducts also permits floor grilles to be cut through wherever the owner prefers, rather than where they can be connected into a duct system.

Mr. Cox has also developed another feature to accompany this system. Usually where ducts are not used, the area directly below the grille is closed in by a galvanized sheet nailed along the bottom of the joist for a length of perhaps two feet. A special fire door consisting of a turned edge piece of iron is hinged to the under flooring and held open by a fusible link. Should a basement fire start this link will melt and let the door fall shut, thus shutting the floor grille from smoke and fire.

The illustrations which accompany this article show several typical Cox installations and houses in which the systems are installed. Two of these houses were erected by speculative builders, but the big heater was installed in an old home.

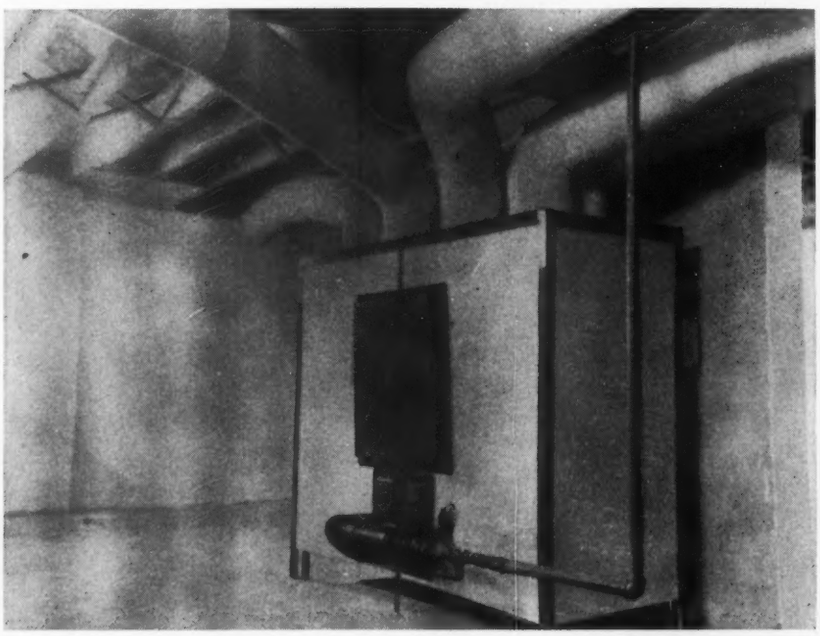
This big furnace has a capacity of 240,000 B.t.u. from three burners. All the old stacks, registers, grilles and round pipe leaders of the old heater were left in place and the new gas furnace moved into the basement. The return system was left in place to the point where the ducts enter the furnace room and here they were cut off making a cold air room around the furnace. One of the old returns so cut off and pointed toward the floor shows in the upper near corner of the photograph.

The photograph also shows the leaders were taken off the low casing straight up to the joists and then run across the basement. The use of this plan is another theory proved out in the Cox experimental basement.

This house was built to sell. Construction is good and the heating plant (below) is one of the selling features used by the builder

The other two houses shown were erected by speculative builders. In the frame house with the single unit, the high efficiency system was adopted and in the basement picture an end of one of the fire door stub returns shows dimly. These speculative houses, being of this year's construction, have generally better arranged and cleaner basements than most old houses. Walls are block or monolithic either painted or cement washed with good floors and drains and adequate facilities for washing walls and floors.

In the brick house a two-furnace system was used. Both units are placed in the basement stair hall, thus throwing open all the rest of the basement for recreation or laundry purposes. One of the units is placed under the basement stairs, the other at the foot. Both are operated off one thermostat located on the north side of the first floor. Each unit serves a group of rooms in one end of the house. This use of two units was adopted to give more basement room and to eliminate leader and duct work. In this system there is a direct-to-furnace return system.

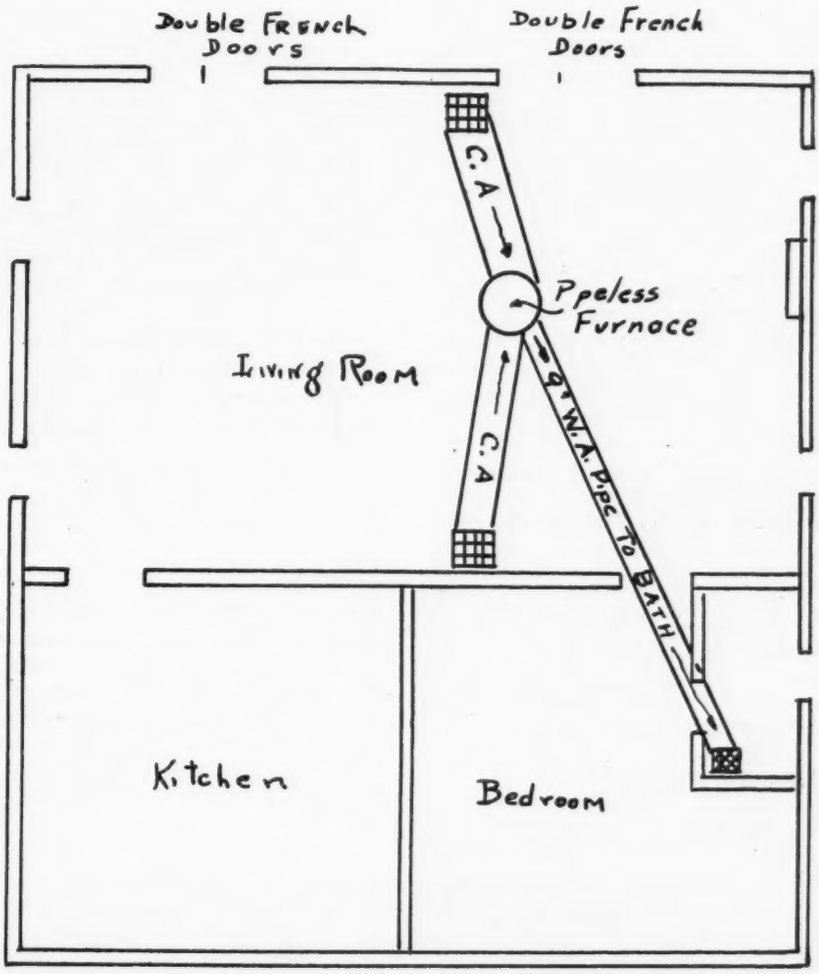


This "high efficiency," two burner unit, is the house shown above. It is a new house with a clean, free basement. All returns are brought through the walls of this furnace room and stopped

More Solutions for the Nov. 9 Heat Robber Problem

WE published on page 21 of the November 9 issue the layout and details of a pipeless furnace installation where a bathroom had to be heated through an individual leader taken off the side of the bonnet. As arranged by the heating contractor, this bathroom did not get warm enough to suit the owner. A heat robber was added to the single leader, but the location and design of the robber seemed to be unsatisfactory.

We asked readers who had had experience with robbers to give us suggestions to improve the system. The first solutions offered were published in the November 23 issue. Now we have completed drawings for a number of other robbers and publish the solutions sent in with the sketches. Here are the latest.



This plan shows how the system is in now. The details below show the bath supply and the robber added later. Still the bath is cold. What would you do on this layout?

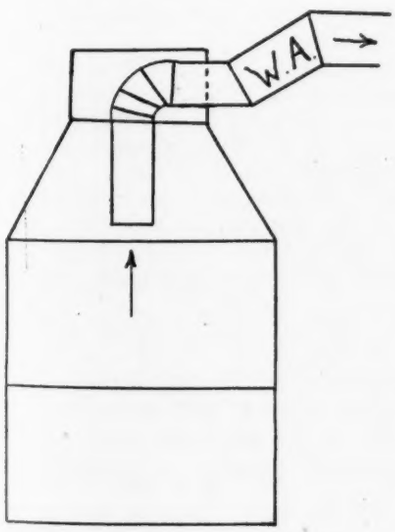
J. Brecka, Avenel, N. J.

J. Brecka, a reader in Avenel, N. J., states that he has done a number of robber installations and has worked out a system which functions splendidly in every instance. The drawing shows how his system is laid out. He says:

"I have just finished cutting in one double register in a pipeless furnace, running 28 feet of 10-inch pipe, inside wall 3½ by 10-inch register located above the baseboard. The layout works like a charm.

"The reader who submitted this problem cut into his furnace all wrong. The pipe should be cut into the furnace as shown on my sketch, that is through the vertical collar and just as high up to the pipeless register as possible. The pipe put through the collar should be large; I use 10-inch whenever possible. This is connected into an elbow and the elbow into a short section of 10-inch pipe which stands vertically over the center of the castings and is carried down to a point just above the radiator. This inside section is connected to whatever size leader pipe should be used for the room.

"I have probably installed more than two dozen robbers built like this and every one except one worked to perfection. The one which didn't work failed because



This is the type of heat robber with which J. Brecka has had good success. The accompany text explains how the piping is proportioned

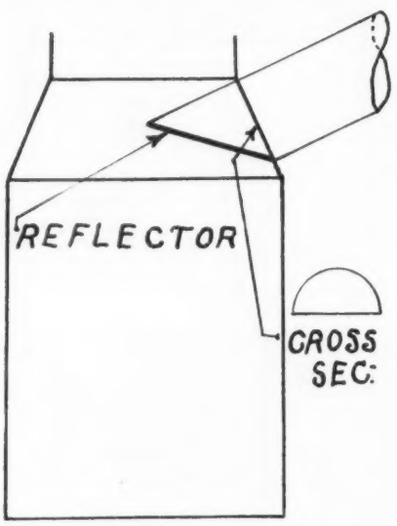
the owners wouldn't fire the furnace.

"In my own house I have a pipeless furnace and I heat my bathroom with one of these robbers. My robber has been in three years and has never failed to heat the room. My register is cut into the side wall from a 16-inch pipe with a 10-inch robber. I do not need a return air pipe from my bathroom nor do I use a vent duct. My register is 22 inches square."

P. H. Cotton, New Orleans

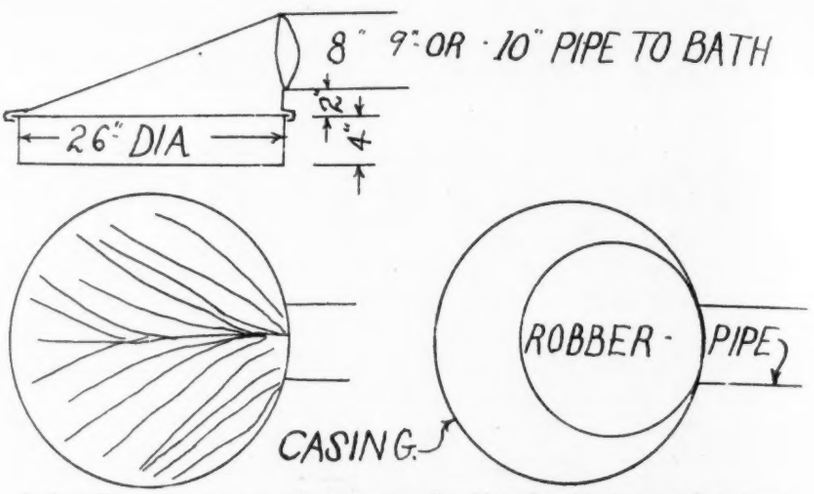
A robber of another type is submitted by P. H. Cotton who conducts a live shop in New Orleans. The robber Mr. Cotton sends in does not require a special fitting and is a reflector made from a split section of the leader pipe. The drawing shows how this looks inside the casing. Mr. Cotton says:

"In a leader as long as this one, the best thing to do is to install a small booster fan. Such a fan would insure circulation through the pipe. Probably this circulation is sluggish.



P. H. Cotton has had good luck with a reflector robber cut and placed like this. It is made from a slit section of pipe

"In case the dealer doesn't care to go to the expense of a fan he can use a reflector like the one shown in the sketch. This is a reflector made in the shape of a half circle. The section is shaped so that this reflector extends out over as much of the radiator as possible. The larger pipe inside the casing the better the robber will work."



Arthur Hunt also uses a reflector type of robber, but his has a 4-inch band around the bottom. The drawing also shows how the sections are cut and seamed. The reflector can be moved out as far over the center of the castings as necessary

Arthur W. Hunt, Kansas City, Missouri

From Arthur W. Hunt of Hunt Brothers, Kansas City, Mo., several of whose forced air heating systems have been reported in the ARTISAN, comes another reflector suggestion. Mr. Hunt says:

"The detailed sketch shows a type of robber or "reservoir" which we have used successfully for 15 years. We have found it necessary to trap the warm air going up the large register as the pull of the large register is so great that a reverse movement of air may be found in a long, sluggish robber leader. Such a reservoir must be designed and placed to accomplish this trapping process."

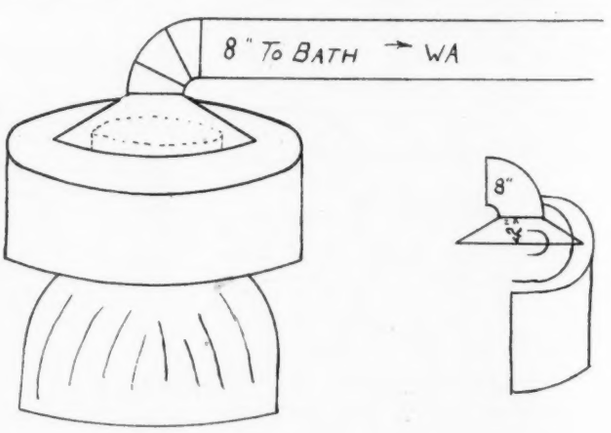
The sketch shows just how this reservoir is built. The reservoir may be attached to any sized leader pipe which the room to be heated requires. The reservoir is built in the shape of a fan with a 4-inch wide band around the bottom. This band should sit down on the radiator. The leader is taken off the side of the fan which should be high enough at the outlet to leave a 2-inch space between the bottom of the leader pipe and the top of the band. How the two sections are put together is shown on the sketch.

F. G. Mathews, Takoma Park, Md.-D. C.

F. G. Mathews, who is the proprietor of the Takoma Sheet Metal Works, Takoma Park, Md., writes that he has used a very simple robber with much success. He also submits a sketch of the robber which is shown. He writes:

"I have had wonderful success with a cone robber made as shown in the sketch. The cone should be made to cover all or most of the space on the inside

F. G. Mathews uses a flat cone which is fastened tight to the radiator. The pipe is taken off the top through a flat, three-piece elbow as shown



of the outer drum if you use a drum type radiator or cover all the space inside the top radiator if the furnace has this type of radiator.

"Be sure to make some provision for fastening the cone down tight on the radiator—a turned flange if the radiator is steel or tapped bolt holes or wire on a cast radiator.

"The hot air coming up through this space is trapped in the cone and a pressure is set up. Even if the leader is flat for as much as 20 feet this cone will send warm air through. The robber cone does not have to be more than 2 inches high. You tap into the robber with an elbow of as short a throat as possible. I usually make the elbow two-piece to avoid a high throat. The elbow and leader through the casing should be at least 8 inches or larger if possible.

"The flutes on the furnace do the work. Even with a cast furnace the robber will work better if the casting has flutes. My belief is that these flutes give the air a whirling motion where they meet at the top and this tends to force the air through the robber."

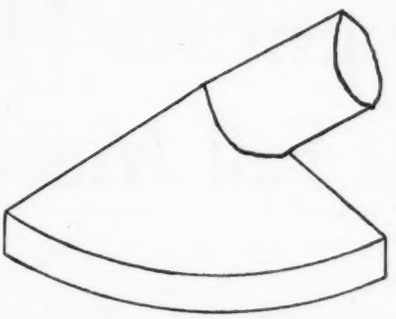
I. Wilson & Co., Dunlap, Iowa

From I. Wilson & Co., in Dunlap, Iowa, comes a very interesting letter which points out several pertinent facts about robber installations. This letter states:

"We offer a solution that we are positive will make the bathroom heat. We have used the method many times with perfect success.

"If the installer of the furnace will make a small hood or cone of sufficient diameter at the bottom to entirely cover the radiator of the furnace, wire the hood down tight on to the radiator and take the pipe off the top of this hood he will have no difficulty in getting plenty of heat out of the pipe.

"The hood should be as tall as possible without obstructing the large hot air pipe too much. We have found it feasible at times to put a short riser on top of the inner hood, and then to run out through the large hot air pipe with an elbow. This method might appear to be unwise as it obstructs the heat flow through the main pipe. This, however, is necessary if the small pipe is to heat, as the suction created in a



Here is a type of cone used by A. Conzelman. The cone should cover the entire opening between the radiator and casting and should be wired or bolted tight

pipeless furnace is considerable and must be broken to some extent. Otherwise the small pipe will act only as an additional cold air pipe.

"Our solution applies to a cast furnace with doughnut type of radiator. With a back radiator or a steel furnace it is no use."

A. Conzelman, Streator, Ill.

From Streator, Ill., A. Conzelman also makes a suggestion for a cone shaped robber, but adds an interesting variation by suggesting the use of insulation for the leader. Here is what he has to say:

"I have satisfactorily repaired several jobs similar to the one described on page 21, November 9 issue.

"If the furnace is a top radiator type, make a cone which will fit snugly over the inside openings of the radiator, resting on the top of the radiator so that all of the air that rises through the openings must go up into the cone.

"Cut a collar in the cone and take the warm air pipe out through the bonnet and connect to the register. If the run is long, cover it with a jacket of air-cell asbestos paper.

"I have never failed to produce more heat than was wanted by this method."

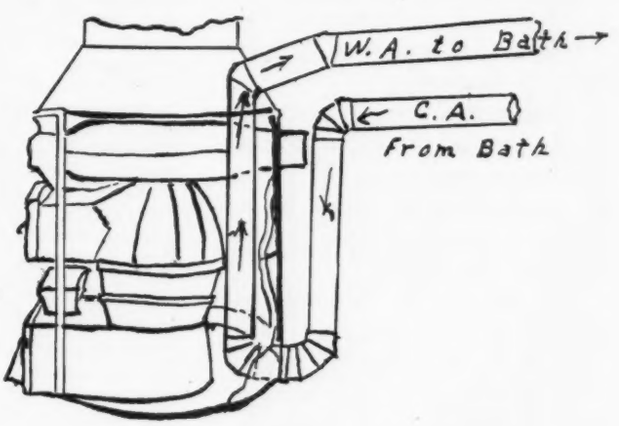
W. S. Langley, Colorado Springs, Colorado

W. S. Langley, who lives in Colorado Springs, Colorado, points out some features of the installation which doesn't work and explains just how he overcomes similar difficulties in pipeless systems by using a complete recirculating type of robber. The sketch shows how his system is designed. He says:

"I wish to present my opinion as to why the pipeless furnace fails to heat the bathroom as described on page 21 of the November 9 issue of the ARTISAN.

"In the first place, the bathroom is air bound and away from the natural air motion. To relieve this condition, it will be necessary to take a return air out of the room. If possible, it is better to have the return air run and the heat pipe together on the inside of the casing as shown on the accompanying sketch.

"Merely tapping a pipe through the bonnet with an elbow turning down on the inside will cause a reversed flow because the rush of air passing the opening creates a suction much the same as a syphon. I never like to put a cone or deflector to act as a robber as it closes off a portion of the free area through the furnace. If it becomes necessary to force the firing for any length of time due to extra cold weather or to heat an air bound room such restriction of the free area can only have one result—a burned up furnace and another black eye to the industry."



W. S. Langley reports that he has had excellent results from a piped robber of this type. His explanation contains some interesting observations on how and why this type works

National Warm Air Heating Ass'n 1931 Fall Meeting

This year's winter meeting of the National Warm Air Heating Association was held this week in Washington, D. C., with official headquarters at the Mayflower Hotel. This winter's meeting is the nineteenth annual convention of the association.

In keeping with the convention city selected, the program contained several speakers of national importance and several high governmental officials. The meeting opened on Thursday with registration early in the morning and the address of welcome scheduled for 10 o'clock.

Although the attendance was not quite as large as some years, the enthusiasm shown and the careful attention paid to the business transactions and to the addresses of speakers and reports of committees more than made up for this lack of members.

It should be mentioned that this attention to the business of the convention was really one of the highlights of the meeting.

There was a very noticeable interest displayed in air conditioning, members feeling, no doubt, that in air conditioning lies much of the hope for expansion and profit in the warm air heating field.

The address of welcome was tendered by Vice-President Littlepage of the Washington Chamber of Commerce. The response was made by President I. L. Jones who announced that arrangements had been made by Congressman Arthur P. Lamneck to meet President Hoover on the White House grounds at noon.

President Jones then briefly reviewed the history of the accomplishments of the association, explaining the founding and operation of the research residence, the work of all the men who have fostered research and progress and explained the great fields which lie ahead. The president then introduced the first speaker of the program, Frank B. Rowley, Vice-President, A. S. H. & V. E., and Director, Experimental Engineering Laboratory, University of Minnesota.

Frank B. Rowley

Mr. Rowley's address was a most interesting and valuable survey of the field of air conditioning—past history, present status and future expansion. Of air conditioning he said:

"Air conditoning has been defined as the changing or regulating of any or all properties of air to give comfort and health or control air conditions in the home and in the factory. Air conditioning had its inception in the fire the cave man built to keep himself warm.

"Schools were one of the first proving grounds, for in schools ventilation was developed into the satisfactory systems used today. We have come to specifically define air conditioning as control of temperature, humidity, air motion, air distribution and air purity. With the control we now have over these factors, the introduction of air conditioning into restaurants, theaters, public buildings and now the home has and will be an important phase of commercial endeavor.

"In air conditioning we now consider three kinds of temperature—(1) dry bulb temperature, (2) yet bulk temperature, (3) effective temperature or the temperature you feel when you step inside a room. It has now become necessary to study cooling for summer use. Cooling was introduced by theaters and is now being demanded by the home owner. Cooling is at present more expensive than winter heating, but costs will be reduced as installations grow.

"At present three methods of cooling are in vogue—(1) cooling by the use of cold water, (2) cooling by use of ice, (3) cooling by use of mechanical refrigeration.

"Cooling by water is the most popular because of its low cost. Installers must be careful, however, to understand that cold water is absolutely necessary—you can't cool with 60, 65, 70 or higher temperature water. The problem with water lies in the control of humidity. Air cooled 10 degrees, but thoroughly saturated with moisture, is more uncomfortable than higher temperatures, but dryer. It takes cold water to dehumidify and the designer must recognize this.

Professor A. C. Willard

Professor A. C. Willard addressed the convention on "Our Coming Research in Mechanical Warm Air Heating." The address was accompanied by a series of lantern slides illustrating the important phases of the talk.

Professor Willard prefaced his address by saying that he had never seen so many prospects for complications in the field of science as today. Theories are being presented on all sides and many of these are in direct conflict. In heating and ventilating, more specific knowledge is necessary. The industries cannot go along on theory.

In his address Professor Willard said:

"The proposed installation of an all-mechanical system of warm-air heating in the Research Residence at Urbana will terminate for the present, at least, any further study of the gravity warm-air heating system now installed in that residence.

"The rapidly developing interest in the subject of forced warm-air heating of residences has induced the Research Advisory Committee of the Association to recommend the suspension of the present research program, and the installation of a complete new layout in the Research Residence with mechanical circulation ready for operation by January 1, 1932.

"The new system will make use of the present coal-fired furnace as used in the initial installation, and will use the same warm-air register outlets as have been in place throughout the gravity circulation period. It may be necessary to change the actual register grilles in these outlets to secure the desired 'free area' velocities. In this way, the effect of a fan application to a gravity furnace will be disclosed as well as the desirability or otherwise of using baseboard registers for mechanical circulation.

"The second and third floor stacks will also be left in place in the initial forced-air installation. All other features of the installation will be new and provision will be made for the introduction of a positive type of humidifier, air washer, or dry air filter. The system will also be automatically controlled, except for the hand firing of the coal used as fuel.

"The principal specifications (See also General Summary Table) of the system follow:

"General Items

"(1-2) 156, 140 B.t.u. calculated loss. 80 deg. temperature difference (+70 to —10 deg.).
Lowest outside temperature at Urbana, Ill., = —25 deg. F. (U. S. W. B.).

Lowest outside temperature at Urbana, Ill., since residence was built = —21 deg. F.
Unfinished bathroom on third floor not included in heat loss.

"(3) Air temperature at register faces, average = 135 deg. F.

"(4) Same furnace, G. A. = 2.88 sq. ft.

"(5) East basement location for furnace.

"(6) Stove size anthracite coal as fuel.

"*Fan Data* (A centrifugal fan—forward curved blades.)

"(7) C. F. M. = 2300.

"(8) Static pressure without air cleaners or washers = 0.13 in.

"(9) R.P.M. = 450 (approx.).

"(10) Motor speed = 1800 r.p.m. (approx.). Pulley dia. ratio = 4 to 1.

"*Air Velocities*

"(11) Maximum velocity in trunk ducts = 750 f.p.m.

"(12) Branch ducts to be cut to an air velocity of 500-600 f.p.m.

"(13) Register free area velocity = 350 f.p.m. (By present plan we have 400 f.p.m. Register grilles to be altered to reduce to proper velocity.)

"(14) Cold air return duct velocity = 750 f.p.m. (and up).

"*Trunk Duct System*

"(15) Trunk system (double trunk).

"(16) Maximum depth of trunk ducts at furnace = 10 in.

"(17) Dampers—Combination of splitter and cross damper types.

"(18-21) Twelve warm-air registers unchanged (one removed). Return registers, probably four on first floor only.

"(22) Arrangement provides for future installation of spray washer and dry filter.

"The objectives in view in making this installation in the Research Residence are to determine both performance and operating data for such a system which will be of the greatest general value or assistance to the members of the Association and the public in designing, installing and operating such systems of heating, ventilating and air-conditioning of residences. Obviously, a most elaborate program of research could be set up, and it is equally obvious that only a small part of such a program can be dealt with immediately.

"It may be well to point out that because of the pressing demand for actual performance data on the operation of a forced warm-air heating system a complete installation is proposed, even though adequate data concerning certain individual features of the plant may be lacking at the present time. With such a plant installed in the Research Residence it will be possible not only to supply much needed operating information, including the important matter of automatic control methods, but also to furnish most valuable and unusual comparative data on a gravity circulation system and a forced circulation system in *the same residence*, using the same furnace and the same fuel in this initial installation. Even with succeeding installations, in which different furnaces and fuels will be used, the residence will be the same and the comparative character of the data obtained will be fully as valuable as for the first installation.

Gilbert Olson, Omaha

Gilbert Olson, who has had long experience in and much success with forced air work, was called upon for an expression of his ideas. Mr. Olson said he could not help but feel that air conditioning will raise the standard of practice and equipment in our industry. Air conditioning, as he observes it, is coming forward so rapidly that we must be careful not to try to make it compete with gravity installations, but advertise it as a modern, improved system of heating.

In Omaha, Mr. Olson stated, his firm has 27 air conditioning jobs under way and has succeeded in making air conditioning preferred over steam and vapor systems which for many years were considered the best available heat.

One rule which has proved applicable in Omaha is to be generous in pricing. Ask at least 10 per cent of the cost of the house for the heating system. If it is a $30,000 house, get $3,000 for your work. His firm has been able to do this and also get from $500 to $750 for small five-room bungalows.

Clarence Olson, Elyria, Ohio

Clarence Olson of Elyria, Ohio, reported that in and around Cleveland air conditioning installations are bringing at least 10 per cent more than vapor heat and getting this preference without trouble. There are a number of installations made or under way in homes costing up to $100,000, he declared.

Meyer, Schmidlin Bros., Toledo

Another opinion on the progress of air conditioning was expressed by E. J. Meyer, engineer of the Schmidlin Brothers Company, Toledo, Ohio. In Toledo, Mr. Meyer, said, air conditioning systems are getting a premium of at least 10 per cent over steam and hot water. Speculative builders are buying air conditioning plants for their houses and making sales on the strength of this new type of heating. Air conditioning systems in Toledo were first used in expensive homes, but houses costing as little as $6,000 are now using semi-air conditioning.

Hugh L. Dryden

The speaker of the afternoon program was Hugh L. Dryden, Chief of the Aerodynamics Division, Bureau of Standards, U. S. Department of Commerce. The subject of his address was "The Relation of the Bureau of Standards to the Problems of Heating and Ventilating."

Outlining briefly the scope of the bureau's activities related to the heating and ventilating fields, Mr. Dryden stated:

"The primary activities of interest to your fields may be classified as the establishment and maintenance of standards of measurement, the development of methods of measurement, the measurement of fundamental constants and properties of materials and the development of specifications.

"The standards of measurement are now concerned with temperature and air speed. Measurement of fundamental constants and properties of materials are the determination of the thermal properties of ammonia and water in the liquid and vapor states, the measurement of heat transfer through building walls, and the measurement of heat flow through fibrous materials, such as insulation materials.

"The bureau is now engaged in investigating the transfer of heat from hot surfaces to air and on the fine structure of turbulent air flow. Most of the audience are familiar with these investigations and the values established."

* * *

Following Mr. Dryden's address the meeting was opened for the transaction of committee business.

F. C. Sedgwick reported that the Committee on Research program had been outlined in the morning's meeting by Professor Willard.

Professor Hoffman, chairman of the Code Committee, stated that his committee was ready to take up the formulation of a forced air code, but that little work could be done until the research program developed facts upon which to base the code. He reminded members of the suggested code being prepared by fan manufacturers and suggested a joint committee to work with the manufacturers.

F. J. Mehrings, chairman of the Trade Relations Committee, reported that his committee's efforts had been strictly curtailed this past year due to lack of funds. The committee has arranged for an association display at the International Heating

Exposition in Cleveland and the convention of the sheet metal industry in Louisville.

A. W. Wreiden, chairman of the Public Information Committee, outlined the publicity to be gained from this meeting in Washington and also stated that his committee's activities had been lessened because of business conditions.

Ralph Blanchard, chairman of the Membership Committee, reported that in spite of bad times applications for membership had been received and accepted from the Automatic Humidifier Company, Cedar Falls, Iowa; Montag Stove Works, Portland, Oregon; American Air Filter Company, Louisville; the Brundage Company, Kalamazoo, Mich. He also reported several associate memberships accepted.

Allen W. Williams, managing director, presented his report as secretary and treasurer. The nominating committee presented the names of all officers elected in April for re-election. These officers are:

Irving L. Jones, president.
W. L. McGrath, first vice-president.
H. T. Richardson, second vice-president.
Allen W. Williams, secretary-treasurer.
Directors, two years: H. P. Mueller, R. W. Blanchard, F. E. Mehrings.

The Banquet

The convention banquet was held on Thursday evening, with H. T. Richardson as toastmaster. D. Rait Richardson presented the association with the Richardson furnace which Washington Irving had presented Christ Church at Tarrytown, N. Y., in 1836. This furnace was used for 75 years. After President Jones acknowledged the gift, Congressman Lamneck presented the furnace to Dr. Wetmore of the Smithsonian Institute.

Interesting and humorous talks were given during the banquet by Dr. Walter Huff, head curator of anthropology, Smithsonian Institute, and Captain Eugene Gempel of the Chemical War Service.

Friday Session

The Friday sessions were presided over by W. L. McGrath, Vice-president.

The speaker who followed L. R. Thompson, was W. H. Kratzer, warm air heating contractor of Detroit, Michigan. The subject he presented was — "Merchandising Furnaces and Developing Repair Trade." This address was packed full of sound merchandising ideas with most of the important selling points illustrated with samples or displays. So many good selling ideas were presented that the article will be presented in detail in a later issue of AMERICAN ARTISAN.

Briefly, here are the highlights of the talk. Mr. Kratzer stated that his business was built around the old, but sound, idea that the customer is always right. That the customer can be reached if only the right methods of getting your story to his attention is employed. In order to accomplish this, his firm has made use of every accepted means of getting the Kratzer name before the public.

The company takes a page in the classified telephone directory, they employ women as house to house canvassers, they maintain a branch office, they use billboards during a part of the year, give out tire covers, send direct mail literature in large quantities, they have used the radio, maintain a sales force and an engineer for forced air work, and of course use their trucks, office building walls, etc., to carry advertising or at least the name of the firm.

Many of their sales efforts are tied into cleaning. And while the price they get does not return a profit, cleaning does get them into basements for repair work and keeps them in touch with owners so that when repairs or replacements are needed Kratzer is the first name the owner thinks of.

Following the interesting address by Mr. Kratzer, the presiding officer asked members for expressions of opinion on the points brought out so clearly by the speaker.

Jack Stowell of Aurora, Illinois, made the statement that while the whole industry is bending every effort to advance forced and conditioned air work, the industry should not forget that after all gravity heating is still the bread and butter of the business and that we should not make the mistake of passing up gravity work in our efforts to land an air conditioning job. "Repair work, too, is highly important," said Jack, "especially in these times when owners are holding onto every dollar like grim death and a replacement campaign may fall on barren ground if some other contractor steps in and agrees to make the old plant work another winter through an inexpensive repair contract."

A speaker who was listened to attentively was Charles H. Landwehr, of the Holland Furnace Company. There are, said Mr. Landwehr, some 10 or 12 million warm air furnaces in use in the country, and at least 8 or 10 million of these should be inspected if not given some service. "What is needed," he declared, "is for more dealers to get over stage fright at the thought of selling and get right out and canvass—ring door bells—solicit repairs and cleaning—in short, make yourself sell and the fright will pass.

George I. Ray, president of the National Association of Sheet Metal Contractors, urged members to get behind the movement to modify the Sherman and Clayton acts. He also invited members of the association to attend his association's convention in Louisville.

Following a short discussion on research, I. W. Rowell, of the Lakeside Company, Hermansville, Mich., was appointed a member of the Research Committee to represent the blower manufacturers.

A telegram was sent E. B. Langenberg, past president, expressing the association's regret at his absence and the hope that he would be able to attend the next convention.

L. R. Thompson

A paper which proved of much interest and value was given by L. R. Thompson, Assistant Surgeon General, Chief, Scientific Research

Division, Bureau of Public Health Service. The subject of this paper was "Good Air and Health." The highlights of this paper are:

"Physiologically almost every living thing, plant or animal, is dependent upon air for life. Physically, air is the medium in which we live and we are largely dependent upon the conditions of the air for our comfort. We have arrived at our present knowledge of air conditioning only by several excursions into unfruitful fields and the trail behind us is filled with the wrecks of wrong ideas.

"The first attempt at explanation related the danger of vitiated air to the increase of carbon-dioxide in the air, but within a few years it was clearly shown that people as well as animals could live in much higher percentages of carbon-dioxide than were usually found in the air without the slightest evidence of harm. Considerable work has been done along this line, but it is the general consensus of opinion that the danger in vitiated air is not to be explained from this angle.

"Even as early as the origin of the poisonous bodies theory another group of workers were studying the physical factors in the air and at the present time it seems to have been clearly shown that most of the symptoms caused by poorly ventilated rooms are due to the prevention of heat losses by the body. The factors in the air which may cause this relate to air motion, temperature and humidity. At east so far as our present knowledge goes, these are the main factors to be considered in proper ventilation. I believe, however, and I think that I express the opinion of others interested in air conditioning, that there is room for considerable work in this field before we are certain that by any means of indoor ventilation we are providing air with all the qualities of outside air.

"Since good ventilation practice at the present time rests largely on the physical factors of air, namely, air motion, humidity and temperature, we can readily see the importance of heating in this problem. It is easy to conceive that at first heat had little influence on the other natural factors of the air, but as our habitations became better shelters and we obtained greater protection against the elements by shutting them out, heating began to play a greater and more disturbing part. During the winter we continually bring cold air into our house and in raising it to a livable temperature we reduced the humidity to a point very much under that found in natural conditions, even in the driest parts of this country.

"The actual effects of this extremely low humidity on health have not been fully studied but according to some authorities it results in a higher prevalence of the upper respiratory diseases such as colds. Certainly all of us have experienced the disagreeable feeling of dryness in the nose when the heat is turned on in the fall. Man is capable of adapting himself to wide variations of temperature and humidity but winter heating causes unnatural conditions which are most difficult to bear.

"You gentlemen are interested in a particular method of heating—if there is any one thought that I would like to leave with you it is that you seriously study your system of heating—not only to provide desirable warmth to our houses but to give us heat in such a way that the normal physical factors in the air are maintained as they are in nature. If you do this good health will be your strongest salesman."

Dr. Stephen I. Miller

The afternoon meeting Friday was opened with an address by Dr. Stephen I Miller, Director of Economics, R. G. Dun and Company, New York. The subject was "Credit Granting." This address contained many points well worth study by members of these industries. Dr. Miller said in part:

"Almost without exception different lines of trade throughout the United States are in cut-throat competition, disturbing business standards and profits. There are many causes for this destructive, wasteful policy; ignorance in price determination, pressure of overhead expense, demand for ready money, and too many men in business.

"Like liberty, competition presupposes reasonably intelligence. A man who is about to go into business should at least know whether he has:

1. The general capacity and training;
2. Selected the proper time and place;
3. Economic justification for an additional unit of the business;
4. The necessary working capital and credit;
5. The technical detail, as well as the vision and power for adaptation;
6. Ability to develop markets, determine credits, and maintain service;
7. Knowledge of costs and price determination;
8. The character necessary for cooperation.

"Of all these requirements, the knowledge of credit is the most far-reaching. This is due to the fact that credit enters into practically every business transaction, from the raw material to the purchase by consumer. Credit is an endless chain. In a single year sixty billion dollars worth of goods are retailed to the American people, and two-thirds of this business is on credit; these same commodities have been passed along, from the wholesaler or manufacturer, on credit; they were manufactured on credit and, for the greater part, produced on borrowed money. The total amount involved in this credit sequence runs into a sum that would stagger the imagination. Add to this the public debt of the national government, of states, cities and counties; add further, the mortgages on real estate, corporate issues of stocks and bonds and foreign loans, and you will have just a fair conception of the credit structure.

"Credit represents the purchasing power of the nation. It is like the volume or flow of water in the stream; it may run full or it may run low; it may be frozen or it may be wasted. The control of credit is the problem in the world today.

"Is this the transition to a fundamental change in our economy structure? Are we about to leave the old doctrine of supply and demand, regulated by competition; are we rapidly approaching the day of managed economy; managed purchsing power; managed foreign trade; managed supply and demand?

"It has now been almost two hundred years since business men cried out to the government and guilds 'Leave us alone.' It was a tired business world that wanted to be released from trade regulations that had come down through the centuries, so the state stepped out, and open self-regulating competition stepped in. This new industrial liberty was abused; modification took place—booms and panics alternated. So the business world comes to the year 1931, with a disposition to go farther in the direction of managed economy than for two centuries. The policy of two steps forward and one step backward is now being challenged as a colossal and unnecessary waste.

"Lest we wake up some morning facing mort difficulties than we face today, it should be remembered that managed economy means management by individuals, bureaus, or commissions, directly or indirectly amenable to the whims and expediency of political parties. As wasteful and insolent as competition may be it might be a business paradise compared to a lock-stepping bureaucracy and fanatical constituency."

One of the interesting sidelights of the convention was the number of telegrams received from leaders of industry.

Walter S. Gifford, head of the President's organization on unemployment, wired the association as follows:

"I am delighted to learn that your industry has been successful in retaining practically all its employees, even on reduced schedule. You have made a definite contribution to the emergency unemployment problem. On the occasion of your twentieth anniversary meeting I extend to you my hearty congratulations and best wishes."

The warm air industry, it was explained at the convention banquet, has been operating at 70 per cent of normal and its employees have averaged four days a week regular employment throughout 1931.

Other messages of felicitation were read from Charles M. Schwab, president of the Bethlehem Steel Corporation; Dr. Nicholas Murray Butler, president of Columbia University; Dr. H. W. Chase, president of the University of Illinois, and other leaders in business, finance and education.

FAN BLAST ENGINEERING

By PLATTE OVERTON
Heating Engineer

Designing Trunk and Branches to Resistance

IN an article of August 13 the writer made the statement, "When individual runs are used the usual method is to design the piping to velocities and place volume dampers in the short runs to control the supply of air, thereby setting up resistance to equalize with the longer runs." Figure 12 is a system that has been designed in this manner.

On this plan 16 class rooms are supplied with 1,500 c.f.m. each. The length of these ducts vary from 8 to 70 feet. The writer personally tested out this installation and set the volume dampers. Those in the short runs are almost closed off. Could these ducts have been designed to resistance? They could and should have been.

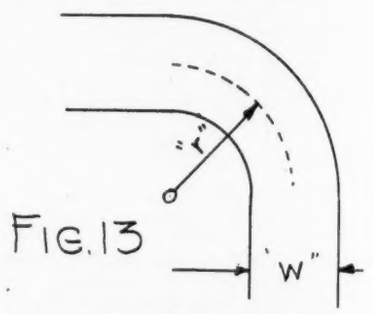
The writer (in this case) feels free to criticize the engineer who designed the system. To begin with he was in a hurry. The design as shown took little or no time or mathematics to arrive at duct sizes, and it was the customary, conventional method. He had employed the method on previous installations and they were heating successfully. Again he was timid about the attitude of the architect for any but a conventional design. We will further criticize this designer (who, by the way, is the writer) by theoretically redesigning the piping system.

Platte Overton

In our last article we proportioned our losses in trunk line with equal outlets and equal length of runs. We have yet to cover the proportioning of losses in trunk lines with unequal branches and lengths of runs and in this article will discuss the proportioning of losses in single runs.

The major losses in piping systems in public buildings such as that shown in Fig. 12 are in the horizontal ducts where the velocity is highest. In fact, where the riser is large and well designed with a velocity of not to exceed 500-600 feet per minute they may be disregarded in the resistance summary.

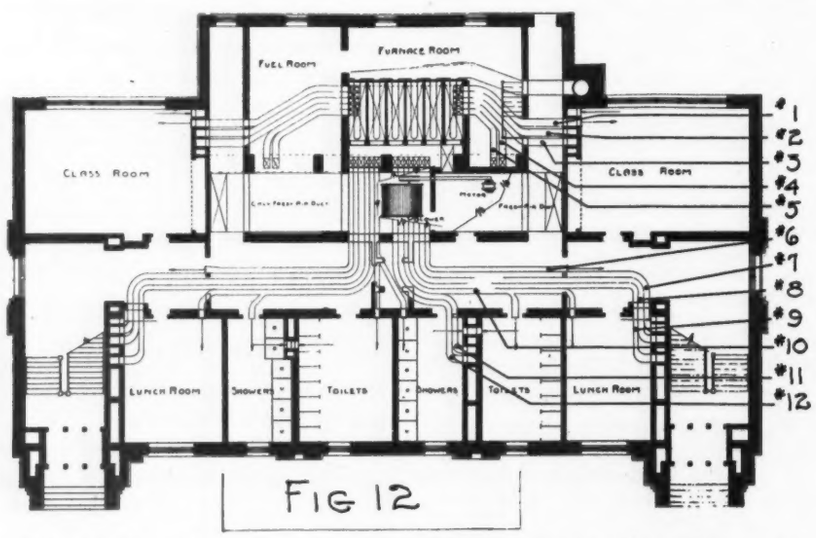
As we are discussing the "ideal" system we will take all the necessary factors into consideration and our duct should be so proportioned that the resistance will be practically equal in all duct regardless of the length.



The radius of the throat is important. This radius should be 1½ or 2 times the width of the duct shown at "w." Longer radii than 2 times "w" does not help flow appreciably

We note that on the plan (Fig. 12) we have one or more elbows in each run. Elbows may be termed necessary evils. In general they give us a liberal percentage of the total pressure loss. Care should be exercised in their design. If *"r"* (Fig. 13) is equivalent to $1\frac{1}{2} \times w$ our results will be satisfactory. $2 \times w$ for *"r"* is a little better. Nothing is gained by designing *"r"* greater than $2 \times w$.

For our calculation we reduce our



This plan shows the layout of the system discussed and also the various ducts numbered for reference with the table at the end of the article

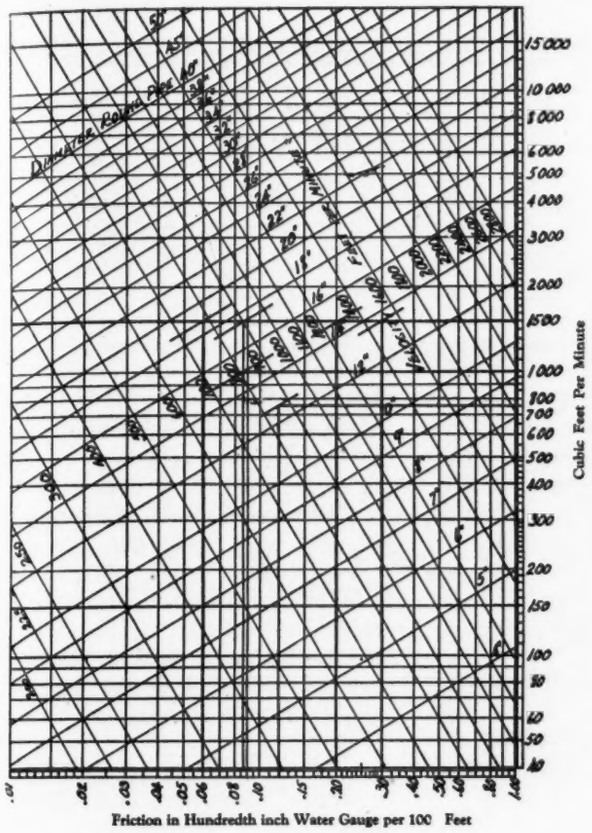


Fig. 14

At the left is shown the friction chart. Select the proper friction, which in this system is .06 and follow up to a point where we intersect the c.f.m. line, which here is 1500, and the point will show the size required in round pipe. The round pipe is changed to rectangular duct by using one of the tables published in several preceding articles

found on the data chart.

From the base of the chart follow vertically to the line from the right on the c.f.m. line. Where the two intersect the round pipe diameter will be found.

The velocities in the various ducts will be found on the angling lines. Note that they vary from 800 feet per minute to 1500 feet per minute, the high velocities being in the small, short ducts. If all ducts were designed to velocities as mentioned, the volume dampers would increase the resistance by retarding the flow and the high velocity would prevail around the damper blade.

Fig. 12 gives us but one half of the ducts as numbered, but those on the lefthand side are duplicates of those on the right.

Note that in the number of elbows given for each run on the data sheet, the one turning up in the flue and the mixing box in the plenum chamber are not counted.

elbows to equivalent lengths of straight pipe. As our elbows on Figure 12 are all designed with a ratio of $1\frac{1}{2} \times w$ for "r" we may add 10 feet of length for each for our final calculations.

Figure 14 is chart showing the friction of air in pipes per 100 feet of length. We wish to design our piping system to .06 inches of water.

On the data sheet, Fig. 15, we find the duct numbers corresponding with those given on the plan Fig. 12. The c.f.m. is given and the equivalent length. Our friction loss chart reads in ducts 100 feet long. As stated, we will design our piping system to .06 inches resistance. Our runs range from 30 feet in length to 100 feet. For the correct size of duct locate the resistance at the base of chart. The resistance place on the chart will be .06 ÷ length. The correct pressure loss positions are

Duct No.	C.f.m.	Length in feet	No. of elbows	Equiv. length	Pressure* Position on chart	Diam. of round pipe in inches	Equiv. rectangular duct
1–2–3	1,500	20	2–45° = 1	30	.2	14.33	12x14**
4–5	1,500	10	2–45° = 1	20	.3	13.5	12x12½
6	750	40	1	50	.12	12.33	12x10½
7–8–9	1,500	70	3	100	.06	18.4	12x24
10	1,000	50	2	70	.0857	14.45	12x14½
11–12	1,500	40	3	70	.0857	16.66	12x19½

*Chart reads in ducts 100 feet long. For longer or shorter runs $\frac{.06}{\text{Length}}$ = pressure loss position on chart.

**Ducts may be made full inch sizes or in place of 12x12½ use 12x13.

Fig. 15

In this table are shown the c.f.m., pipe length, number of elbows, equivalent length, pressure, diameter in round pipe and equivalent rectangular duct for all the mains shown in Fig. 12. The author explains how this table is used

To this .06 loss we must add the loss for the intake, heaters and plenum, for our total. In the above installation the total loss was .52 inches.

The Fifty-First Annual Number of AMERICAN ARTISAN will be published as the next issue—December 21. So far as we are able, this number will be a screen upon which to throw a picturization of the astounding changes which are now evident in warm air heating, ventilation, sheet metal fabrication and air conditioning. Of equal importance will be the numerous articles devoted to various phases of present day merchandising methods as practiced by readers of AMERICAN ARTISAN

CAN YOU TELL ME ?

Hero Furnace

From Al Sharp, Montezuma, Indiana.

From Al Sharp, Montezuma, Indiana, and W. H. Kruse, Coeur d'Alene, Idaho.

Who manufactures the Hero furnace?

Ans.—Standard Foundry & Manufacturing Company, De Kalb, Illinois.

Psychrometer

From Egstad Sheet Metal Works, Grand Forks, North Dakota.

Where can we get an instrument for measuring the humidity of the air (Psychrometer)?

Ans.—The Foxboro Company, Foxboro, Massachusetts; E. Vernon Hill Company, 121 North Clark Street, Chicago, Illinois.

Brass Numeral Checks

From Modglin Roofing & Heating Company, Metropolis, Illinois.

Where can we get brass numeral checks?

Ans.—C. H. Hanson Company, 303 West Erie, Chicago, Illinois.

Elaterite Cement

From H. E. Schwager, Pipestone, Minnesota.

Where can we get Elaterite Cement mentioned in your article on Spandred Waterproofing?

Ans. — Western Elaterite Roofing Company, 841-844 Equitable Building, Denver, Colorado.

Milk Bottle Filler Valve

From Robert J. Steger Sheet Metal Works, Avilla, Indiana.

Where can we get a milk bottle filler valve?

Ans. — Cherry - Burrell Corporation, 427 West Randolph Street, Chicago, Illinois.

Evaporation Pans

From J. C. Marlow, Belle Center, Ohio.

Where can I get evaporation pans for sorghum molasses?

Ans.—Armor Metal Products Company, 1114-1120 Straight Street, Cincinnati, Ohio; Kirk & Blum Manufacturing Company, 2801 Spring Grove Avenue, Cincinnati, Ohio; Republic Steel Corporation, Youngstown, Ohio; Vitreous Enameling Corporation, 6705 Grant Avenue, Cleveland, Ohio.

Built-In Wall Safes

From G. T. Magee, Greenville, Pennsylvania.

Where can we get small built-in wall safes?

Ans.—Mosler Safe Company, 60 West Lake Street; York Safe & Lock Company, 217 West Monroe Street; both of Chicago, Illinois.

Humidifiers

From National Regulator Company, Chicago, Illinois.

Who manufactures humidifiers for furnaces?

Ans.—Refer to Buyers' Directory.

Vacuum Cleaner Hose

From H. E. Griffin Sheet Metal Shop, Bedford, Indiana.

Where can we buy 1½-inch flexible vacuum cleaner hose?

Ans.—W. D. Allen Manufacturing Company, 566 West Lake Street, Chicago, Illinois.

"A. B." Furnace

From Earl Mahoney, Muncie, Indiana.

Who manufactures the "A. B." furnace?

Ans.—A. B. Stove Company, Battle Creek, Michigan.

Roofing Slate

From Modglin Roofing & Heating Company, Metropolis, Illinois.

Where can we get roofing slate?

Ans.—Rising & Nelson Slate Company, 2554 West Harrison Street; Vendor Slate Company, 140 South Dearborn Street; both of Chicago, Illinois.

Asbestos Dry Paste

From Southern States Iron Roofing Company, Savannah, Georgia.

Who manufactures the asbestos dry paste used in applying asbestos paper to sheet metal pipes and furnaces?

Ans.—H. B. Fuller Company, 186 West Third Street, St. Paul, Minnesota.

Gas Conversion Burners

From S. D. Crum, Helena, Montana; C. A. Hugo, West Point, Nebraska.

Who manufactures gas conversion burners.

Ans.—List mailed.

Art Stove Company

From Howard E. Williams, Colchester, Illinois.

Where is the Art Stove Company, makers of the "Laurel" Furnace, located?

Ans.—6900 Jefferson Avenue, East, Detroit, Michigan.

Rathbone, Sard & Company

From Howard E. Williams, Colchester, Illinois.

Where is Rathbone, Sard & Company located?

Ans.—Rathbone, Sard & Company has consolidated with the Standard Gas Equipment Company of Aurora, Illinois.

"Knox" Cast Iron Stove Pipe

From Quaker Manufacturing Company, Chicago, Illinois.

Who makes "Knox" Cast Iron Stove Pipe?

Ans.—Waterloo Register Company, Waterloo, Iowa.

Cast Iron Smoke Pipe

From Droegkamp Furnace Company, Milwaukee, Wisconsin.

Who manufactures cast iron stove pipe?

Ans.—Sternaman Company, 441 Williams Street, Springfield, Illinois; Waterloo Register Company, Waterloo, Iowa.

Centennial Cut-offs

From R. L. Spellerberg & Son, Dubuque, Iowa.

Who manufactures centennial cut-offs?

Ans. — The Allred Manufacturing Company, Inc., 2829-31 Northwestern Avenue, Indianapolis, Indiana.

Deflectors

From Ross Furnace & Repair Company, Sandusky, Ohio.

Who manufactures deflectors for baseboard warm air registers?

Ans.—Beh & Company, 1140 Broadway, New York City; General Products Corporation, 3607 Orchard Avenue, Indianapolis, Indiana; Hall-Neal Furnace Company, 1322-32 North Capitol Avenue, Indianapolis, Indiana (with humidifier).

AND NOW, PAYNE OFFERS THE

NEW STANDARD CONSOLE

A Real Heat Circulator... Built to Sell at a Popular Price!

Here it is—a *Full Vented Warm Air Heat Circulator...* for homes, offices, stores and auditoriums. Front louvre and Top Grille Models in three sizes from 15,000 to 30,000 B. T. U. capacity. Answers every modern heating need of the conscientious dealer. Instant appeal to owners and renters. New Features. New price ranges. Investigate immediately.

FRONT LOUVRE MODEL

Features:

• Burner is reversible for right or left hand connections. • Completely welded gas-tight and air sealed heating element. • Built-in Vent Manifold and Down-Draft Diverter for short vent connection. • Insulated outer casing keeps top and side cool. • Heater stands close to wall, improving appearance—set closer to floor, eliminating floor drafts. • When warm air louvres are closed gas cannot be turned on. • When open, louvres direct heat into upper areas of room providing complete circulation and warm air distribution. • May be equipped with Automatic Room Temperature Regulator. • Thermostatically controlled burner eliminates necessity of a pilot. • No open flames or exposed valves... absolutely safe for women and children. • Antique walnut crinkle finish—extremely attractive and durable. • ALSO—For stores, banks, churches, clubs, cafes, schools and factories, a New *Top Grille* Model with one-piece square lattice cast grille finished in statuary bronze!

WRITE FOR LITERATURE

Payne

PAYNE FURNACE & SUPPLY CO.

Beverly Hills, Calif.

There is a Payne Heat System for Every Building and Climate.

Not just another catalog

but a comprehensive book on air conditioning

ANY furnace dealer or sheet metal contractor will profit substantially by writing immediately for this new book.

It is not highbrow or super-technical. It gets right down to cases and explains in everyday language the various reasons for the development of air conditioning. It is the kind of book you can leave with the architect, builder or owner with the knowledge that it will go a long way to closing a sale.

For the man or firm that has done furnace work only and is on the point of broadening out into the air conditioning market, there are selling points galore.

We could say much more about this fine book, particularly about the Hess Climate Master, but we'd rather you send for the book. After that, we can get together and explain more in detail about the valuable Hess Dealership for 1932. So—

MAIL THE COUPON NOW

HESS WARMING & VENTILATING COMPANY
1201-1211 S. Western Ave., Chicago

Send me your new book on air conditioning right away.

Name.....

Address.....

I am a Furnace Dealer ☐ Sheet Metal Contractor ☐

NEW ITEMS and NEWS ITEMS
From and about the Manufacturers and Jobbers

Berger Brothers Develops Double Bead Strap Hanger

Berger Brothers, 229 Arch Street, Philadelphia, announce that since acquiring the "Rival" Strap Hanger for single bead eaves troughs they have developed a hanger along similar lines for use on double bead gutters. The company also states that so far as they know this is the only strap on the market for double bead gutters. The company has applied for a patent.

The strap locks around both beads and holds the gutter firmly in position by reason of its snug fit all around. The cross bar is in one piece and is designed to prevent spreading.

A leaflet describing and showing the new hanger may be had by writing the company.

✦

Equator Gas Furnace Leaflet Announced

The Lennox Furnace Company, Marshalltown, Iowa, and Syracuse, N. Y., have a new leaflet describing the Equator gas furnace. The leaflet is printed in two colors and illustrates all the features of the gas furnace.

Complete descriptions of the furnace's features as well as complete description of the construction and capacity of the various sizes are given in tables and text.

Copies of this leaflet may be had by writing the company.

✦

New Jersey Zinc Has New Zinc Sheet

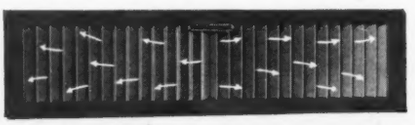
New Jersey Zinc Company, 160 Front Street, New York City, announce a new zinc product to be known as "High Grade Sheet Zinc" and for which some exceptional properties are claimed. Foremost of these features is the property of suitability for bending both with and across the grain. The company announces that bending, forming and seaming processes fail to crack this new sheet.

The properties of this new sheet are contained in a leaflet which the company will mail to any contractor interested in this new sheet.

Waterloo Register Company Diffuser Register

The Waterloo Register Company, Waterloo, Iowa, announces a new type warm air register known as the "Diffuser." The register, when used in connection with fan systems, makes it possible to force heat to any part of a room by adjusting vertical louvres in the face of the register.

The louvres are divided into two sections, each section opening toward the edges of the face. The blades can



be opened to any desired degree to spread the air stream as widely as required.

The blades can be closed tightly during summer. The "Diffuser" has the same smooth panel effect as the regular Waterloo Standard register. The register can be furnished with a lock attachment and set according to the needs of heating or ventilating required.

A leaflet showing and describing the new register will be mailed upon request.

✦

Modern Domestic Service Equipment Booklet

The International Nickel Company, Inc., 67 Wall Street, New York City, has prepared a new booklet describing the uses of bright metals in domestic installations. The booklet consists of 30 pages and is profusely illustrated with photographs of actual installations.

Present day uses of metals in kitchens, pantries, hotels and other places are shown and discussed. Practically every type of sink, work table, cabinet, and special equipment is shown.

A chapter is devoted to an explanation of the properties of Monel Metal and another chapter to forms and finishes used with Monel.

A very interesting chapter shows a suggested specification for fabrication of custom built equipment.

Copies of the booklet may be had by any contractor interested in entering the field of special equipment fabrication.

Lew H. Soper Joins Bergstrom Mfg. Co.

Lew H. Soper, for several years connected with the pipe and fittings department of Milcor Steel Company, Milwaukee, has been appointed secretary and director of sales of the Bergstrom Manufacturing Company, Neenah, Wisconsin.

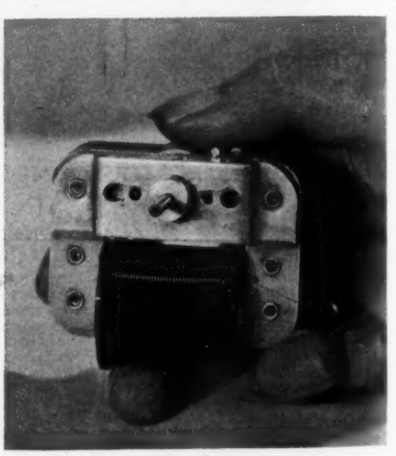
Mr. Soper's headquarters will be at the Bergstrom branch, 4602 West Mitchell Street, Milwaukee, Wis.

✦

New Small A. C. Motor

A new fractional-horsepower electric motor, no larger than the palm of one's hand, and with unusually high power output for its size, is now available for commercial use, according to an announcement recently made by Barber-Colman Company of Rockford, Illinois. The motor is furnished for either unidirectional or electrically reversible rotation, and is made for any voltage between 10 and 230, and for alternating current frequencies from 25 to 60 cycles. Special two-speed models of the motor can be furnished.

The motor is ruggedly constructed of steel laminations, brass bearing plates



with oiless bearings and a squirrel-cage rotor upon a hardened shaft. All coils are wound on phenolic resin spools and impregnated to exclude moisture and insure good insulation.

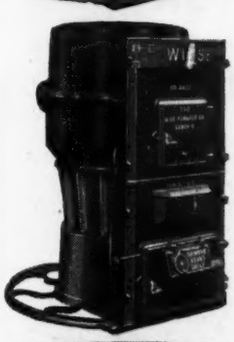
Characteristics and advantages of the Barcol Motor include small size with relatively high power output, quiet operation and absence of interference to radio reception.

BALANCED

THAT'S WHY WISE DEALERS SELL THE WISE BALANCED LINE

WISE 20

One of the Wise Balanced line. The "20 Series" Cast Furnaces with all the every day features and many unusual ones. The "WISE 20" will bring credit to you as a dealer.



WISE 40

The Wise "40 Series" is the open dome type with the new cellular one-piece firepot, which insures evenly distributed air blast and provides complete combustion. Extra heavy castings, ribbed firepot, shaker handle and engineered design.

WISE GAS

In presenting the Wise Super Efficient Gas Fired Furnace, we realize that the WISE reputation must be upheld. Therefore, months of engineering, experimenting, testing and proving, stand back of this—The WISE GAS FIRED FURNACE.

Write for Booklets
23 and G2

THE WISE FURNACE CO.
AKRON -:- OHIO

WISE DEALERS SELL WISE FURNACES

HEALTHAIR

Warms in Winter—Cools in Summer

BLOWERS AIR WASHERS

Low Priced *Efficient*

COMPLETE AIR CONDITIONING IN A SINGLE UNIT

The HEALTHAIR CONDITIONER

A product combining into one compact unit, air washer, blower and humidifier. In summer it cools and in winter it circulates pure, humidified, washed air throughout the house. It equalizes heat within three degrees between ceiling and floor.

GET OUR PROPOSITION

HEALTH-AIR SYSTEMS

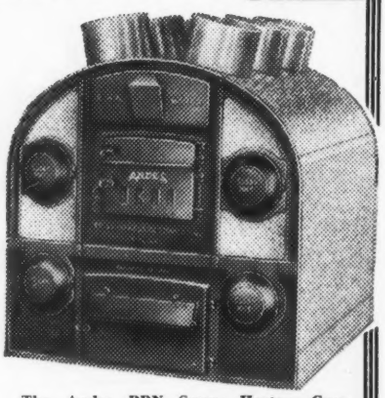
1105 North Main St. Ann Arbor, Mich.

Say you saw it in AMERICAN ARTISAN—Thank you!

ANDES FURNACES

"For Better Heating"

Warms
Ventilates
Humidifies
Purifies
and
Refreshes
the
Home!



The Andes BRN Super Heater, Constructed for Lowest Type Basements.

It will pay you well to install the ANDES "BRN" Super Heater

Offers the dealer a real unit and an opportunity to supply real air conditioning and make healthful homes. Super construction, as well as the unusual design makes ANDES FURNACES leaders and assists in bringing the dealer to the front.

Investigate our dealer proposition and unlimited merchandising cooperation

–ANDES–
RANGE & FURNACE CORP.
Geneva, New York

Distributors Wanted

WEATHER MAKING

Holds the Headlines of Public Interest

Now is the time when the good men, the ambitious men, prepare to profit from this trend. In the Pioneer Weather King you will find the finished product—perfected, trouble free, and offering 14 sales points that hit home with the prospect.

Write for literature

THE MENOMINEE Air Washer Company

Menominee Michigan

Air Conditioning Machinery

Fun for the CHILDREN

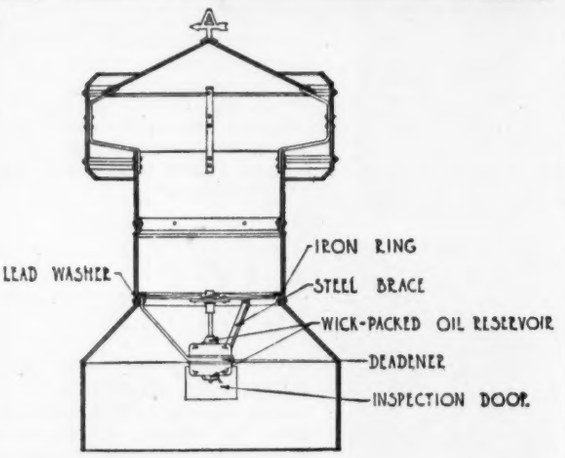
"Fun but— for the children.. but"

is one of several small folders with which contractors using Anaconda Copper are reminding customers of the economy of durable sheet metal work. Over half a million of these were furnished free to contractors last year, all specially imprinted with their firm names and addresses. The American Brass Company, Waterbury, Conn.

ANACONDA COPPER

JORDAN AERO VENTILATION

F-DIRECT CONNECTED-AN VENTILATOR



A Unit for greater efficiency.
Combining gravity, ventilator and fan action.
Eliminating wind and weather hazard.

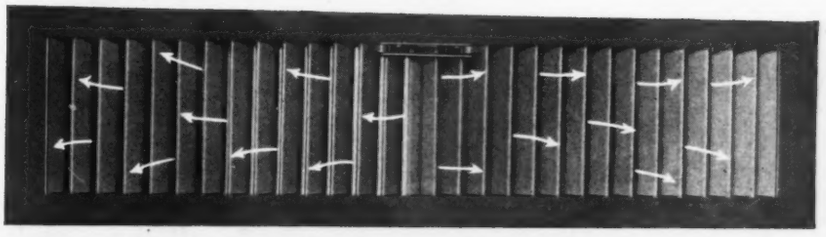
Backed by a complete engineering service

PAUL R. JORDAN & CO.
630 South Delaware St. Indianapolis, Ind.

WATERLOO

For Conditioned Air Systems

Made in
any size,
any finish,
any quantity,
with cold air
grilles to match



DIFFUSER

A Register That Controls—Directs Air Volume

First—Adjustable shutters permit the deflection of all or any part of the heat in desired direction or directions (see illustrations).

Second—Locking device (optional) permits air requirement of room to be computed and shutters locked to allow only correct amount of air to enter.

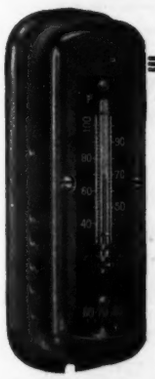
100% Improvement over old type "registers"

Adds immensely to the value of *your forced air installations*, especially in finer homes, hotels, schools, hospitals, churches. A great profit-maker for you.

Be the first in your locality to feature this new improved register. Have the edge on competition. All America will be wanting it in another year. Be ahead of the parade. Write at once for full illustrated literature and dealer prices.

WATERLOO REGISTER CO., Box A, Waterloo, Iowa

822 Clanton St., Los Angeles, Calif. 2211 First Ave., Seattle, Wash.



DEALER PRICE
$24.50
Including every necessary fitting. Sells for $45.00 plus installation

H&C AUTOMATIC HEAT CONTROL

The Outstanding NET-Profit Producer in the Heat Control Field

FIRST: Because it is priced to sell to that vast market constituted by folks of moderate means.
SECOND: Because you can't beat its performance at any price.
THIRD: Because it is 100% *dependable*—never requires servicing. Your entire profit, exclusive of selling cost, is *net* profit.

See your jobber at once. Write us for information, sales helps, etc.

HART & COOLEY MFG. CO.
General Sales Office
61 West Kinzie St.
Chicago, Ill.

H&C AUTOMATIC HEAT CONTROL

Business Builders

"True to the Name"
FAULTLESS
WARM AIR FURNACES

Building business for dealers everywhere because they are better furnaces. Your installations will be increased, too, when you feature Faultless Furnaces; they are a boon to business. Write for franchise facts and figures!

The Graff Furnace Co.

SCRANTON, PENNA.

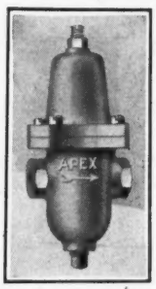
New York City Sales Office:
116-118 Wooster St.

Say you saw it in AMERICAN ARTISAN—Thank you!

HANDY PIPE

"Built To Outlast The Buildings It Goes Into"

F. Meyer & Bro. Co.
Peoria, Ill.



APEX Class BB Self-Contained, All-Bronze, Reducing Valve or Pressure Regulator, with Large-Capacity Strainer and Drip Pocket.

FOR HUMIDIFIERS

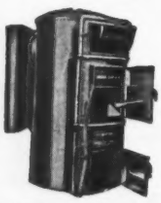
APEX Water Pressure Regulators or Reducing Valves with Built-in Strainers and Drip Pockets

Will Insure

MINIMUM WATER CONSUMPTION
NOISELESS OPERATION
STEADY WATER FLOW
PROPER HUMIDITY CONTROL
MINIMUM WEAR ON NOZZLE OR ORIFICE

Apex Regulator Company
Division of Fisher Governor Company
Marshalltown, Ia.

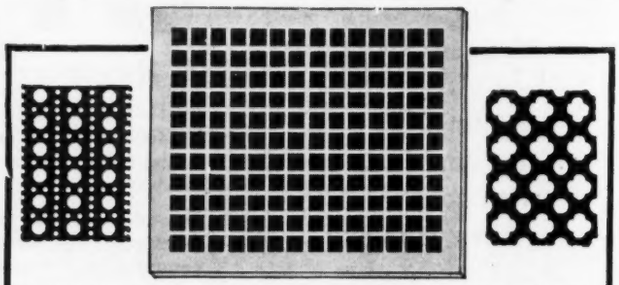
WESTERN



The Western Steel Furnace has made many friends among your prospective customers and will make many more if you show them its numerous advantages.

Write for information

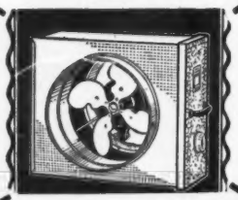
WESTERN STEEL PRODUCTS CO.
130 Commonwealth Ave. Duluth, Minn.



PERFORATED METAL GRILLES
OF EVERY TYPE
SQUARE PERFORATIONS—IMITATION CANE and OTHER DESIGNS
For Ventilating Outlets, Warm or Cold Air Vents, Radiator Covers, etc.
Made to your specifications—in Steel, Brass, Bronze, etc.
All shapes—sizes and gauges—with screw holes if desired.
Send Us Your Specifications—Prompt Shipment
Attractive Prices
CHICAGO PERFORATING COMPANY
2444 West 24th Place Chicago, Illinois

Let This Unit Make Year Around Sales for You!

A-C
Thermo-statically controlled
Automatic HEAT BOOSTER



Write for full information and name of nearest jobber

EASY TO INSTALL
EASY TO SELL

A-C MANUFACTURING CO.
417 Sherman Avenue Pontiac, Illinois

File This Copy

When you have finished reading this issue of AMERICAN ARTISAN, pass it on to others in your organization, marking the articles in which they should be particularly interested.

Then file it for future reference. You never know when you will encounter a problem in your business that is covered in this very issue.

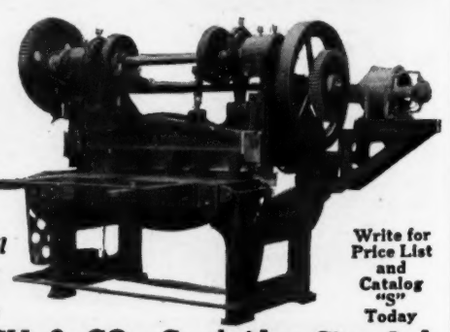
PREMIER
FURNACES

"Constantly Improved, Supreme in their Field"
Guaranteed for 10 Years

PREMIER *De Luxe* (Cast Iron)
Write for 1931 Catalog
PREMIER *Duo-Weld* (Steel)

BERTSCH POWER SHEAR

BELT OR — MOTOR DRIVE
Takes lightest sheets to Heaviest Plates
—
Built in all Standard Sizes and Capacities



Write for Price List and Catalog "S" Today

BERTSCH & CO., Cambridge City, Ind.

ASBESTOS PAPER PRODUCTS
MADE ESPECIALLY FOR THE
WARM AIR TRADE

GRANT WILSON, INC.
4101 West Taylor Street
Chicago, Illinois

Warehouses in the leading cities

MONCRIEF FURNACES

The Aristocrat
Series "C" Cast
Gas Heating Air Conditioner
New Steel Furnace
Pipe and Fittings

Send for Catalogs

THE HENRY FURNACE & FOUNDRY CO.
3471 East 49th St. Cleveland, Ohio
Phone Michigan 9322

Keep Your Shop Busy All Winter With the Tornado Furnace Cleaner

The Tornado Furnace Cleaner gets you into the basement where it is easy to sell furnace repairs. And you make a profit on the cleaning job too!

One dealer sold 150 repair jobs as a result of furnace cleaning.

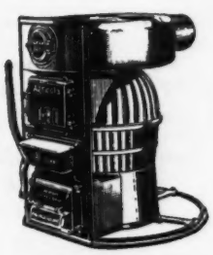
Tornado is most powerful cleaner built, low in price.

Write for sales plan that tells you how to get the business

Only $149.50 Easy Terms and Free Trial

Breuer Electric Mfg. Co.
865 Blackhawk St., Chicago

Order Only Genuine
Agricola
REPAIR PARTS



Only genuine AGRICOLA Repair Parts assure perfect fitting castings. Prompt shipments.

AGRICOLA FURNACE CO., Inc.
Gadsden, Alabama
Offices in principal cities

ROUND OAK
The World's Greatest Warm Air Furnace Values
ROUND OAK FURNACE CO.
Dowagiac - - - Michigan

HERE IT IS—

The New
WHITNEY PUNCH
No. 4 B

The only punch on the market offering all of these advantages.
Drop Forged—Parts Heat Treated—Punches and Dies Interchangeable with Our No. 4 Punch
Power—¼ Inch through 16 Gauge.
Deep Throat—2 Inches.
Balance—Natural Grip Handles Give Perfect Balance.
Weight 3 pounds.
Length—8½ Inches.

W. A. WHITNEY MFG. COMPANY
636 RACE STREET, ROCKFORD, ILL.

The "Torrid" Furnace is designed to give a tremendous amount of heat, much more than that furnished by the ordinary tinner's furnace.

A fuel saver and generating machine of the finest quality made at the price.

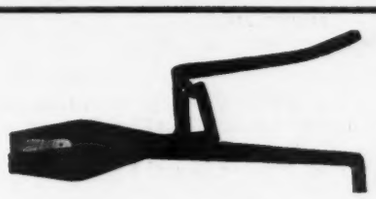
GEO. W. DIENER MFG. CO.
404 North Monticello Ave. Chicago

THE VIKING SHEAR

Compound lever handle—removable blades. Upper blade away from mechanic enabling easy following of work—exclusive Viking feature.

Sold Under a Guarantee—Send for Particulars

VIKING SHEAR COMPANY, Erie, Pennsylvania



~ MARKET QUOTATIONS ~

AMERICAN ARTISAN is the only publication quoting Prices on Metals, Sheet Metal Equipment and Supplies, Warm Air Heating Supplies and Accessories, corrected bi-weekly. These quotations are not guaranteed but are obtained from reliable sources and reflect nation-wide market conditions at the time of going to press.

NOTE—These prices are Chicago Warehouse Prices, to which must be added territory differentials

METALS

PIG IRON

Chicago Fdy., Nos. 2	$17.00
Southern Fdy., No. 2	17.01
Lake Superior Charcoal	25.04
Malleable	17.00

FIRST QUALITY BRIGHT CHARCOAL TIN PLATES

IC	20x28 112 sheets	$25.80
IX	20x28	27.45
IXX	20x28 56 sheets	14.95
IXXX	20x28	16.10
IXXXX	20x28	17.35

TERNE PLATES

	Per Box
IC 20x28, 40-lb. 112 sheets	$22.50
IX 20x28, 40-lb. 112 sheets	25.00
IC 20x28, 25-lb. 112 sheets	19.60
IX 20x28, 25-lb. 112 sheets	22.10
IC 20x28, 20-lb. 112 sheets	18.25
IX 20x28, 20-lb. 112 sheets	20.75

"ARMCO" INGOT IRON PLATES

No. 8 ga.—110 lbs.	$4.15
3/16 in.—100 lbs.	4.05
¼ in.—100 lbs.	3.85

COKE PLATES

Cokes, 80 lbs., base, 20x28	$12.00
Cokes, 90 lbs., base, 20x28	12.20
Cokes, 100 lbs., base, 20x28	13.75
Cokes, 107 lbs., base, IC, 20x28	12.75
Cokes, 135 lbs., base, IX, 20x28	14.75
Cokes, 155 lbs., base 2X, 56 sheets	8.50
Cokes, 175 lbs., base, 3X, 56 sheets	9.35
Cokes, 195 lbs., base, 4X, 56 sheets	10.25

HOT ROLLED ANNEALED SHEETS

Base 10 ga.	per 100 lb.	$3.25
"Armco" 10 ga.	per 100 lbs.	4.15

HOT ROLLED ANNEALED SHEETS 16 GA. AND HEAVIER

No. 18	per 100 lbs.	$3.25
No. 20	per 100 lbs.	3.35
No. 22	per 100 lbs.	3.45
No. 24	per 100 lbs.	3.55
No. 26	per 100 lbs.	3.65
No. 27	per 100 lbs.	3.70
No. 28	per 100 lbs.	3.80

GALVANIZED

No. 16	per 100 lbs.	$3.70
No. 18	per 100 lbs.	3.80
No. 20	per 100 lbs.	3.90
No. 22	per 100 lbs.	4.00
(Standard differentials on extras to apply)		
No. 24	per 100 lbs.	$4.10
No. 26	per 100 lbs.	4.35
No. 27	per 100 lbs.	4.45
No. 28	per 100 lbs.	4.60
"Armco" 24	per 100 lbs.	5.75

BAR SOLDER

Warranted 50-50	per 100 lbs.	$19.25
45-55	per 100 lbs.	17.00
48-52	per 100 lbs.	17.75
Plumbers'	per 100 lbs.	15.50

ZINC

In Slabs	$5.00

SHEET ZINC

Cask Lots (600 lbs.)	$12.00
Sheet Lots (100 lbs.)	13.00

BRASS

Sheets, Chicago base	16 ⅝ c
Tubing, seamless, Chicago base	20 ½ c
Wire, Chicago base	16 ⅝ c
Rods, Chicago base	13 ⅝ c

COPPER

Sheets, Chicago base	18 ½ c
Tubing, seamless, Chicago base	20 ⅝ c
Wire, plain rd., 8 B. & S. Ga. and heavier	9 ⅝ c

LEAD

American Pig	$6.00
Bar	7.50

TIN

Bar Tin	per 100 lbs.	$33.00
Pig Tin	per 100 lbs.	32.00

SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES

ASBESTOS

Paper up to 1/16	6c per lb.
Roll board	6 ½ per lb.
Mill board, 3/32 to ⅛	6 ½ c per lb.
Corrugated paper (250 sq. ft. per roll)	$4.25 per roll
Pipe joint tape, per 500 lineal feet	$1.50

ASBESTOS SEGMENTS

8 in.	per 25 sets	$1.50
9 in.	per 25 sets	1.75
10 in.	per 25 sets	2.00
12 in.	per 25 sets	2.50

CEMENT, FURNACE

5-lb. cans, net	$0.40
10-lb. cans, net	0.80
25-lb. cans, net	2.00
Per 100 lbs.	7.50

CLIPS

Damper

No-Rivet Steel, with tail pieces, per gross	$8.25
Rivet Steel, with tail pieces, per gross	7.50
Tail pieces, per gross	2.00

COPPER FOOTING

Copper Footing	43 %

CORNICE BRAKES

Chicago Steel Bending

Nos. 1 to 6B	Net

CUT-OFFS

Gal. plain, round or cor. rd.	
26 gauge	30 %
28 gauge	35 %

DAMPERS

Yankee Warm Air

7 inch, doz.	$1.60
8 inch, doz.	2.20
9 inch, doz.	2.60
10 inch, doz.	2.80
12 inch, doz.	3.50
14 inch, doz.	5.00

EAVES TROUGH

Galv. Crimpedge, crated	75-15 %
Zinc	60 %

ELBOWS

Conductor Pipe

Galv. plain or corrugated, round flat Crimp.

28 gauge	60-10 %
26 gauge	50 %
24 gauge	15 %

Galvanized Terne Steel

Plain Rd. and Rd. Corr.

28 gauge	60-10 %
26 gauge	50 %
24 gauge	15 %

Square Corrugated

28 gauge	55 %
26 gauge	40 %

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.

Not nested	70 & 5 %
Nested solid	70 & 5 %

Sq. Corr., A. & B. & Octagon

28 gauge	55 %
26 gauge	40 %

Portico

1, 1¼, 1½ inch 45 %

Copper

16 oz., all designs 50 %

Zinc

All styles 60 %

ELBOWS—Stove Pipe

1-piece Corrugated, Uniform Blue No. 28 Gauge.

	Doz.
5 inch	$1.15
6 inch	1.25
7 inch	1.75

Adjustable—Uniform Blue

No. 28 Gauge, Uniform Blue.

5 inch	$1.60
6 inch	1.75
7 inch	2.10

WOOD FACES—60 % off list.

FIRE POTS

	Each
No. 02 Gasoline Torch, 1 qt.	$ 5.13
No. 9250, Kerosene or Gasoline Torch, 1 qt.	6.50
No. 10 Tinner's Furnace Square tank, 1 gal.	11.20
No. 15 Tinner's Furnace Round tank, 1 gal.	10.70
No. 21 Gas Soldering Furnace	3.60
No. 110 Automatic Gas Soldering Furnace	10.50

GLASS

Single and Double Strength, A, all brackets	85 %
Single and Double Strength, B, all brackets	87 %

HANGERS

Conductor Pipe

Milcor Perfection Wire	25 %
Milcor Triplex Wire	10 %

Eaves Trough

Steel (galv. after forming), from list	45 %
Selflock E. T. Wire, List	10 %

HOOKS

Conductor

"Direct Drive" Wrought Iron, for wood or brick 15 %

MITRES

Galvanized Steel Mitres

28 gauge	70-15 %
26 gauge	70- 5 %

PASTE

Asbestos Dry Paste

200-lb. barrel	$15.00
100-lb. barrel	7.75
50-lb. pail	4.50
25-lb. pail	2.50
10-lb. bag	1.20
5-lb. bag	.60

PIPE

Galvanized

Crated and nested (all gauges)	75-12½ %
Crated and not nested (all gauges)	75-7½ %

Furnace Pipe

Double Wall Pipe and Fittings	60 %
Single Wall Pipe, Round Galvanized Pipe	60 %
Galvanized and Tin Fittings	60 %

Lead

Per 100 lbs.	$12.50

Stove Pipe

"Milcor" "Titelock" Uniform Blue Stove

28 gauge, 5 inch U. C. nested	$10.00
28 gauge, 6 inch U. C. nested	11.00
28 gauge, 7 inch U. C. nested	13.00
30 gauge, 5 inch U. C. nested	9.25
30 gauge, 6 inch U. C. nested	10.00
30 gauge, 7 inch U. C. nested	12.00

T-Joint Made Up

6-inch, 28 gauge	per doz. $3.40

REGISTERS AND FACES

Floor Registers

Steel and Semi-Steel	40 & 10 %
All Cast Iron	20 %

Baseboard

2-Piece	40 & 10 %
1-Piece	40-10 & 20 %

Adjustable Ventilators

Adjustable Ventilators	40 & 10 %

COLD AIR FACES

Steel and Cast, less than 14" width	40 & 10 %
Steel, 14" and wider	65 & 10 %
Cast, 14" and wider	60 & 10 %
Special Cold Air Faces, Steel or Cast	40 & 10 %

RIDGE ROLL

Galv., Plain Ridge Roll, b'dld	75-15-5 %
Galv., Plain Ridge Roll, crated	75-15 %

SCREWS

Sheet Metal

7, ½ x ⅝, per gross	$0.52
No. 10, ⅝ x 3/16, per gross	0.68
No. 14, ⅞ x ¼, per gross	0.83

SHEARS, TINNERS' AND MACHINISTS'

Viking	$22.00

Lennox Throatless

No. 18	35 %
Shear blades	10 %
(F.o.b. Marshalltown, Iowa)	

SHOES

Galv. 28 Gauge, Plain or Corrugated, round flat crimp	60-10 %
26 gauge, round flat crimp	50 %
24 gauge, round flat crimp	15 %

SNIPS

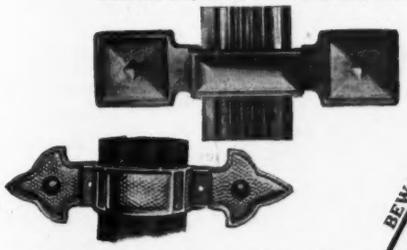
Tinners'	Net

VENTILATORS

Standard	30 to 40 %
Milcor	Net

RIVAL STRAP CORP. 308 WEST 20th ST. NEW YORK, N. Y.

THE RIVAL AND FITRITE
One-Piece Ornamental Leader Straps
Patented July 10th, 1928; Jan. 6th, 1931



Made in six styles. Write for folder showing complete line and sizes.
STRAPS SOLD THRU JOBBERS ONLY

BEWARE OF IMITATIONS

"FITRITE"
Mop Heads & Staples
Malleable Iron
Write Dept. "A" for full details and prices

"FITRITE" SKYLIGHT GEARING

Iron or Bronze 3/8"-1/4" and 1" sizes
Made also for chain operation

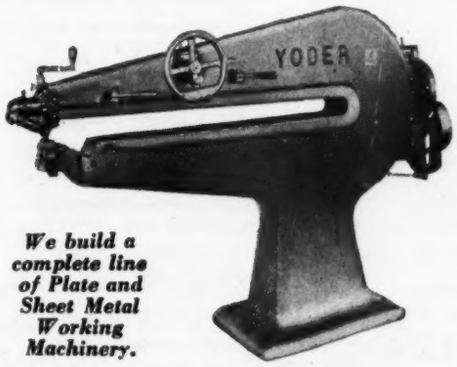
"Fitrite" Adjustable PIPE SNOW GUARDS
Galvanized Iron or Bronze

Type "X"

"FITRITE" *Bronze* ROOF STRAINERS
3 Types. For Roofs having inside cast iron leader. Type "X" (illustrated) also made in Mal. Iron.

"FITRITE" *Bronze* BEEHIVE STRAINERS
For Round Leaders
3"-4"-5"-6"-7"-8" Diameter

DAVID LEVOW 308 WEST 20TH ST. NEW YORK



We build a complete line of Plate and Sheet Metal Working Machinery.

Yoder No. S-60 Rotary Shear

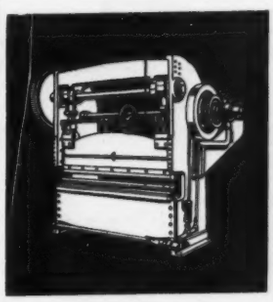
This shear with 60" gap to accommodate large sheets, will cut any weight of sheet metal up to 14 gauge. It can be used for short curves in any direction and will cut circles without running in from the side of material. This machine has two speeds controlled by hand lever and is equipped with a Yoder friction clutch. Write for further information.

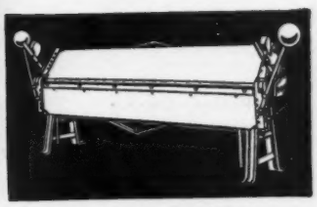
THE YODER COMPANY
W. 55 ST. and WALWORTH AVE. CLEVELAND, OHIO
PLATE AND SHEET METAL MACHINERY SPECIALISTS
Harry G. Masten Company, 4119 N. Lawler Ave., Chicago Sales Representative

FURNACE STOVE & BOILER - REPAIRS

PROMPT and COMPLETE SHIPMENTS

DES MOINES STOVE REPAIR CO.
Des Moines, Iowa



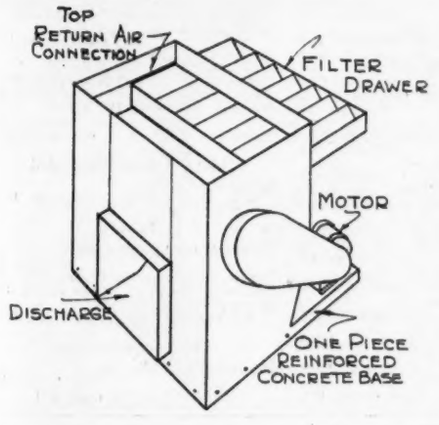


CHICAGO

Press Brake — Hand Bending Brake

STEEL BRAKES—PRESSES—SHEARS

DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. CHICAGO



LONG LIFE AIR CLEANER and CONDITIONER

A new and silent blower and filter unit. Comes assembled ready to install. Only unit completely assembled at factory on its own foundation. Total weight only 75 pounds. Capacities up to 1800 c.f.m. at 1/4" S.P. Adaptable to warm air, steam, vapor, or hot water air conditioning system. Comes attractively painted. Filter dry type in sliding drawer. S. K. F. ball bearings on fan and motor. Requires attention but once per year. Tested and approved at our factory by Platte Overton. Write today for information regarding agency, prices, terms, and window display. A business getter at a price less than blowers and filters in separate units.

THE GENERAL AIR CONDITIONING COMPANY, INC.
2755 West 31st Street Chicago, Illinois

BUYERS' DIRECTORY

Air Cleaners

American Air Filter Co., Inc., Louisville, Ky.
American Fdy. & Furnace Co., Bloomington, Ill.
General Air Conditioning Co., Inc., Chicago, Ill.
Kleenaire Filter Co., Stevens Point, Wis.
Lakeside Co., Hermansville, Mich.
Meyer & Bro., F., Peoria, Ill.

Air Washers

American Machine Products Co., Marshalltown, Iowa
Brundage Co., Kalamazoo, Mich.
A. Gehri & Co., Tacoma, Wash.
Health Air Systems, Ann Arbor, Mich.
Hess Warming & Vent. Co., Chicago, Ill.
Lakeside Co. Hermansville, Mich.
Menominee Air Washer Co., Menominee, Mich.

Asbestos—Liquid

Technical Products Co., Pittsburgh, Pa.

Asbestos Covering and Paper

Standard Asbestos Co. of Chicago, Chicago, Ill.
Wilson, Grant, Inc., Chicago, Ill.

Ash Sifter

Diener Mfg. Co., G. W., Chicago, Ill.

Blast Gates

Berger Bros. Co., Philadelphia, Pa.

Blowers

American Fdy. & Furnace Co., Bloomington, Ill.
American Machine Products Co., Marshalltown, Iowa
Brundage Co., Kalamazoo, Mich.
Emerson Elec. Mfg. Co., St. Louis, Mo.
A. Gehri & Co., Tacoma, Wash.
General Air Conditioner Co., Inc., Chicago, Ill.
Health-Air Systems, Ann Arbor, Mich.
Hess Warming & Vent. Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Lakeside Co., Hermansville, Mich.
Menominee Air Washer Co., Menominee, Mich.
Warm Air Furnace Fan Co., Cleveland, Ohio

Brakes—Bending

Dreis & Krump Mfg. Co., Chicago, Ill.
Interstate Machinery Co., Chicago, Ill.

Brakes—Cornice

Dreis & Krump Mfg. Co., Chicago, Ill.

Brass and Copper

American Brass Co., Waterbury, Conn.
Revere Copper and Brass Inc., Rome, N. Y.

Cans—Garbage

Diener Mfg. Co., G. W., Chicago, Ill.

Castings—Malleable

Fanner Mfg. Co., Cleveland, Ohio

Ceilings—Metal

Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Cement—Furnace

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Technical Products Co., Pittsburgh, Pa.

Cement—Roofing

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.

Chain—Furnace

Hart & Cooley Mfg. Co., Chicago, Ill.

Chaplets

Fanner Mfg. Co., Cleveland, Ohio

Cleaners—Furnace Vacuum

Baker Furnace Co., Toledo, Ohio
Breuer Elec. Mfg. Co., Chicago, Ill.
Brillion Furnace Co., Brillion, Wis.
Densmore & Quinlan Co., Kenosha, Wis.
Grand Rapids Furnace Cleaner Co., Grand Rapids, Mich.

Conductor Elbows and Shoes

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Conductor Fittings

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
David Levow, New York, N. Y.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Rival Strap Corp., New York, N. Y.

Conductor Pipe

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Copper

American Brass Co., Waterbury, Conn.
Revere Copper & Brass Inc., Rome, N. Y.

Cornices

Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Crimping Machines

Bertsch & Co., Cambridge City, Ind.
Yoder Co., The Cleveland, Ohio

Cut-offs—Rain Water

Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Dampers—Quadrants—Accessories

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Aeolus Dickinson Chicago, Ill.
Hart & Cooley Mfg. Co., Chicago, Ill.
Howes Co., S. M., Boston, Mass.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Parker-Kalon Corp., New York, N. Y.
Young Ventilating Co., Cleveland, Ohio

Dampproofings

Lastik Products Corp., Pittsburgh, Pa.

Diffusers—Air Duct

Aeolus Dickinson, Chicago, Ill.

Draft Stabilizers

Silent Automatic Corp., Detroit, Mich.

Drive Screws—Hardened Metallic

Parker-Kalon Corp., New York

Eaves Trough

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Eaves Trough Hangers

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Berger Bros. Co., Philadelphia, Pa.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Fans—Exhaust

Emerson Elec. Mfg. Co., St. Louis, Mo.

Fans—Furnace

A-C Mfg. Co., Pontiac, Ill.
American Fdy. & Furnace Co., Bloomington, Ill.
Emerson Electric Mfg. Co., St. Louis, Mo.
A. Gehri & Co., Tacoma, Wash.
Warm Air Furnace Fan Co., Cleveland, Ohio

Fans—Ventilating

Emerson Elec. Mfg. Co., St. Louis, Mo.

Filters—Furnace

American Air Filter Co., Inc., Louisville, Ky.
A. Gehri & Co., Tacoma, Wash.
Independent Air Filter Co., Chicago, Ill.
Kleenaire Filter Co., Stevens Point, Wis.
Lakeside Co., Hermansville, Mich.

Fluxes—Soldering

Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Forming Rolls

Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

Furnaces for Gas or Oil

Dail Steel Products Co., Lansing, Mich.
Health-Air Systems, Ann Arbor, Mich.

Furnaces—Gas

American Fdy. & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Henry Furnace & Foundry Co., Cleveland, Ohio
Lennox Furnace Co., Marshalltown, Iowa
Meyer Furnace Co., Peoria, Ill.
Payne Furnace and Supply Co., Beverly Hills, Calif.
Round Oak Furnace Co., Dowagiac, Mich.
Western Steel Products Co., Duluth, Minn.
Wise Furnace Co., Akron, Ohio

Furnaces—Gas Auxiliary

Forest City Foundries Co., Cleveland, Ohio

Furnaces—Oil Burning

Motor Wheel Corp., Heater Div., Lansing, Mich.

Furnaces—Warm Air (See Also Unit Air Conditioners)

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Agricola Furnace Co., Gadsden, Ala.
American Fdy. & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Andes Range & Furnace Corp., Geneva, N. Y.
Armstrong Furnace Co., Columbus, O.
Brillion Furnace Co., Brillion, Wis.
Dail Steel Products Co., Lansing, Mich.
Deshler Foundry & Machine Works, Deshler, Ohio
Enterprise Boiler & Tank Works, Chicago, Ill.
Forest City Foundries Co., Cleveland, Ohio
General HeatingCo., St. Paul, Minn.
Graff Furnace Co., Scranton, Pa.
Hall- Neal Furnace Co., Indianapolis, Ind.
Health-Air Systems, Ann Arbor, Mich.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Hess Warming & Vent Co., Chicago, Ill.
Lennox Furnace Co., Marshalltown, Iowa
Liberty Foundry Co., St. Louis, Mo.
May Fiebeger Furnace Co., Newark, Ohio
Meyer Furnace Co., The, Peoria, Ill.
Midland Furnace Co., Cleveland, Ohio
Motor Wheel Corp., Heater Div., Lansing, Mich.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Payne Furnace & Supply Co., Beverly Hills, Calif.
Peerless Foundry Co., Indianapolis, Ind.
Premier Warm Air Heater Co., Dowagiac, Mich.
Round Oak Furnace Co., Dowagiac, Mich.
Schwab Furnace & Mfg. Co., Cedar Grove, Wis.

Furnaces—Warm Air (See Also Unit Air Conditioners)

U. S. Furnace Co., Youngstown, Ohio
Waterman-Waterbury Co., Minneapolis, Minn.
Western Steel Products Co., Duluth, Minn.
Wise Furnace Co., Akron, Ohio

Gages—Draft

Ellison Draft Gage Co., Chicago, Ill.

Grilles

Auer Register Co., Cleveland, Ohio
Chicago Perforating Co., Chicago, Ill.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Chicago, Ill.
Independent Register & Mfg. Co., Cleveland, Ohio
Tuttle & Bailey Mfg. Co., New York
U. S. Register Co., Battle Creek, Mich.

Guards—Machine and Belt

Chicago Perforating Co., Chicago, Ill.
Harrington & King Perforating Co., Chicago, Ill.

Handles—Boiler

Berger Bros. Co., Philadelphia, Pa.

Handles—Furnace Door

Fanner Mfg. Co., Cleveland, Ohio

Handles—Soldering Iron

Parker-Kalon Corp., New York, N. Y.

Heaters—Cabinet

Agricola Furnace Co., Gadsen, Ala.
Motor Wheel Corp., Heater Division, Lansing, Mich.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Payne Furnace & Supply Co., Beverly Hills, Calif.
Premier Warm Air Heater Co., Dowagiac, Mich.
Waterman-Waterbury Co., Minneapolis, Minn.

Heaters—School Room

Meyer Furnace Co., The, Peoria, Ill.
Waterman-Waterbury Co., Minneapolis, Minn.
Western Steel Products Co., Duluth, Minn.

Humidifiers

Automatic Humidifier Co., Cedar Falls, Iowa
Clarm Mechanical Devices Co., Lima, Ohio
Columbus Humidifier Co., Columbus, Ohio
Diener Mfg. Co., G. W., Chicago, Ill.
Hess Warming & Vent. Co., Chicago, Ill
Menominee Air Washer Co., Menominee, Mich.
Meyer & Bro. Co., F., Peoria, Ill.
Sallada Mfg. Co., Minneapolis, Minn.

Humidifier Valves

Apex Regulator Co., Marshalltown, Iowa

Machinery—Culvert

Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

Machinery—Rebuilt

Interstate Machinery Co., Chicago, Ill.

Machines and Tools—Tinsmith's

Bertsch & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Niagara Mach. & Tool Wks., Buffalo, N. Y.
Parker-Kalon Corp., New York, N. Y.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Yoder Co., The, Cleveland, Ohio

Metal Lath—Expanded

Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Miters

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Motors—Electric

Emerson Elec. Mfg. Co. St. Louis, Mo.

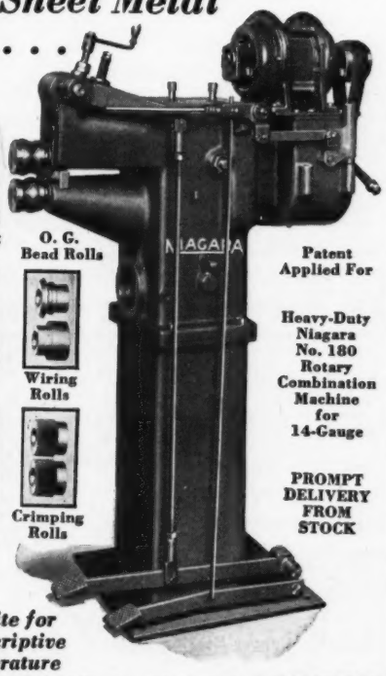
(Continued on page 38)

NIAGARA

Rotary Combination Machine for Heavier Sheet Metal Operations . . .

BURRING
TURNING
WIRING
BEADING
CRIMPING
CRIMP AND BEAD
SLITTING
CIRCLE CUTTING
FLANGING
ELBOW EDGING

and other operations performed faster and more accurately.



Turning Rolls
O. G. Bead Rolls
Single Bead
Wiring Rolls
Slitting Cutters
Crimping Rolls

Patent Applied For

Heavy-Duty Niagara No. 180 Rotary Combination Machine for 14-Gauge

PROMPT DELIVERY FROM STOCK

For 18-Gauge Niagara No. 172 Electric Combination Machine

Write for Descriptive Literature

NIAGARA MACHINE & TOOL WORKS

Manufacturers of Presses, Shears, Machines and Tools for Working Sheet Metal

637-697 Northland Avenue Buffalo, N. Y.

New York City 50 Church St. | Philadelphia Elverson Bldg. | Pittsburgh Park Bldg. | Detroit General Motors Bldg.

MARSHALLTOWN THE MARSHALLTOWN LINE **SHEARS**

No. 18

SHEARS THAT CUT

That's what you're looking for—shears that will save money for you—shears that stand the gaff.

Install at least one type of Marshalltown throatless shears in your shop. Do it now!

SHEARS FOR EVERY JOB: CUTTING CAPACITY UP TO ½".

The MARSHALLTOWN line is complete—a shear for every use.

THE CATALOGUE TELLS THE STORY—WRITE FOR IT

SPECIFICATIONS

CAPACITY—
18 gauge and lighter — 1¾" radius.

CUTTERS—
2"x1⅛"—high grade tool steel. Slightly knurled to feed material.

ADJUSTMENT—
One bolt. Instructions furnished.

SIZE AND MATERIAL—
Height 19½"; head cast iron; base cast iron; gears steel and cast iron. Shipping weight 45 lbs.

MARSHALLTOWN MFG. CO. MARSHALLTOWN IOWA

PERFORATED METALS

All Sizes and Shapes of Holes
In Steel, Zinc, Brass, Copper, Tinplate, etc.
For All Screening, Ventilating and Draining
EVERYTHING IN PERFORATING METAL

THE HARRINGTON & KING PERFORATING CO.
5649 FILLMORE ST.—CHICAGO, ILL., U. S. A.
NEW YORK OFFICE 114 LIBERTY ST.

A CATALOG YOU SHOULD HAVE—

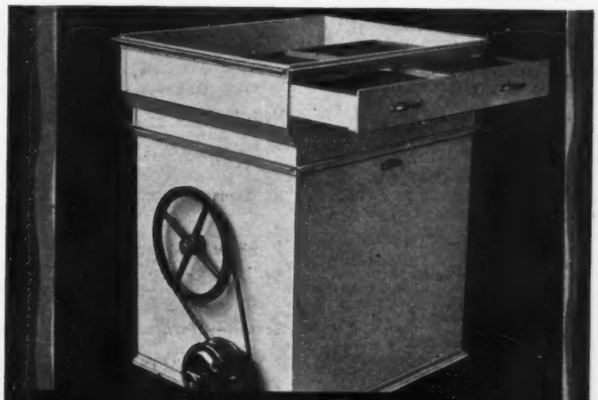
WRITE FOR IT

LEADING JOBBERS EVERYWHERE RECOMMEND—

B-B PRODUCTS

Mitres, conductor pipe, hangers, eaves trough, caps, outlets, pipe hooks and fasteners

BERGER BROTHERS CO.
229-31 Arch St. Philadelphia



Furblo

DEPENDABLE AIR-CONDITIONING SYSTEM

Performance Data is GUARANTEED

Every element in Furblo Air Conditioning equipment has passed our own rigid tests for efficient performance, and has proven itself thoroughly practical in actual use. Guaranteed-correct performance data eliminates costly guesswork. You make *sure of* complete satisfaction when you specify Furblo.

LAKESIDE COMPANY, Hermansville, Mich.
Makers of Lakeside Ventilating Systems

BUYERS' DIRECTORY

(Continued from page 36)

Nails—Hardened Masonry
Parker-Kalon Corp., New York, N. Y.

Oil Burners
Northern Oil Burners Inc., Minneapolis, Minn.
Silent Automatic Corp., Detroit, Mich.

Paint
Connors Paint Mfg. Co., Wm., Troy, N. Y.

Perforated Metals
Chicago Perforating Co., Chicago
Harrington & King Perforating Co., Chicago, Ill.

Pipe and Fittings—Furnace
Henry Furnace & Fdy. Co., Cleveland, Ohio
Meyer & Bro., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Peerless Foundry Co., Indianapolis, Ind.

Pokers—Furnace
Fanner Mfg. Co., Cleveland, Ohio
Independent Reg. & Mfg. Co. Cleveland, Ohio

Pulleys—Furnace
Hart & Cooley Mfg. Co., Chicago, Ill.

Punches
Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.
Niagara Mach. & Tool Wks., Buffalo, N. Y.
Parker-Kalon Corp., New York, N. Y.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
W. A. Whitney Mfg. Co., Rockford, Ill.

Punches—Combination Bench and Hand
Niagara Mach. & Tool Wks., Buffalo, N. Y.
Parker-Kalon Corp., New York, N. Y.

Punches—Hand
Niagara Mach. & Tool Wks., Buffalo, N. Y.
Parker-Kalon Corp., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.

Putty-Stove
Connors Paint Mfg. Co., Wm., Troy, N. Y.

Radiator Cabinets
Hart & Cooley Mfg. Co., Chicago, Ill.
Tuttle & Bailey Mfg. Co., New York

Registers—Warm Air
Auer Register Co., Cleveland, Ohio
Forest City Foundries Co., Cleveland, Ohio
Hart & Cooley Mfg. Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Register & Mfg. Co., Cleveland, Ohio
Meyer & Bro., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Symonds Register Co., St. Louis, Mo.
Tuttle & Bailey Mfg. Co., New York
United States Register Co., Battle Creek, Mich.
Waterloo Register Co., Waterloo, Ia.; L. A., Cal.; Seattle, W.

Registers—Wood
Auer Register Co., Cleveland, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Regulators—Automatic Furnace
Hart & Cooley Mfg. Co., Chicago, Ill.
Lakeside Co., Hermansville, Mich.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modern Heat Regulator Co., Cleveland, Ohio
Pioneer Heat Regulator Co., Dayton, Ohio
White Mfg. Co., Minneapolis, Minn.

Regulators—Automatic Heat
Hart & Cooley Mfg. Co., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modern Heat Regulator Co., Cleveland, Ohio
Pioneer Heat Regulator Co., Dayton, Ohio
Tuttle & Bailey Mfg. Co., New York
White Mfg. Co., Minneapolis, Minn.

Repairs—Stove and Furnace
Brauer Supply Co., A. G., St. Louis, Mo.
Des Moines Stove Repair Co., Des Moines, Iowa
Northwestern Stove Repair Co., Chicago, Ill.
Peerless Fdry. Co., Indianapolis, Ind.

Solder—Rosin Core
Kester Solder Co., Chicago, Ill.

Ridging
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Rings—Furnace Casing
Forest City Foundries Co., Cleveland, Ohio

Roof Flashing
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Roof Paints
Connors Paint Mfg. Co., Wm.,
Lastik Products Corp., Pittsburgh, Pa.

Roofing—Iron and Steel
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Newport Rolling Mill Co., The, Newport, Ky.
Republic Steel Corp., Youngstown, Ohio

Roofing—Tin and Terne
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Republic Steel Corp., Youngstown, Ohio

Rubbish Burners
Hart & Cooley Mfg. Co., Chicago, Ill.

School—Sheet Metal Pattern Drafting
St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating
St. Louis Technical Institute, St. Louis, Mo.

Screws—Hardened Metallic Drive
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Parker-Kalon Corp., 200 Varick St., New York

Screws—Hardened Self-Tapping, Sheet Metal
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Parker-Kalon Corp., New York

Screens—Perforated Metal
Chicago Perforating Co., Chicago, Ill.
Harrington & King Perforating Co., Chicago, Ill.

Scuppers
Aeolus Dickinson, Chicago, Ill

Shears—Hand and Power
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Niagara Mach. & Tool Wks., Buffalo, N. Y.
Viking Shear Co., Erie, Pa.
Yoder Co., The, Cleveland, Ohio

Sheet Metal Screws—Hardened, Self-Tapping
Parker-Kalon Corp., New York

Sheets—Alloy
Inland Steel Co., Chicago, Ill.
International Nickel Co., New York, N. Y.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio

Sheets—Black and Galvanized
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio

Sheets—Copper
American Brass Co., Waterbury, Conn.
Revere Copper & Brass Inc., Rome, N. Y.

Sheets—Iron
Granite City Steel Co., Granite City, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio

Sheets—Copper Bearing Steel
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio

Sheets—Nickel
International Nickel Co., New York

Sheets—Pure Iron Copper Alloy
Newport Rolling Mill Co., Newport, Ky.

Sheets—Special Finish
Inland Steel Co., Chicago, Ill.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio

Shingles and Tile—Metal
Globe Iron Roofing & Corrugated Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Skylights
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Snips
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Snow Guards
Berger Bros. Co., Philadelphia, Pa.
David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Solder
Kester Solder Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Solder—Acid Core
Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Solder—Self-Fluxing
Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Soldering Furnaces
Diener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Soot Destroyer
Saginaw Salt Prod. Co., Saginaw, Mich.

Specialties—Hardware
Diener Mfg. Co., G. W., Chicago, Ill.

Stars—Hard Iron Cleaning
Fanner Mfg. Co., Cleveland, Ohio

Stove Pipe and Fittings
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Stove and Furnace Trimmings
Fanner Mfg. Co., Cleveland, Ohio

Strainers—Roof
David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Straps—Ornamental Pipe
David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Tinplate
Granite City Steel Co., Granite City, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Republic Steel Corp., Youngstown, Ohio

Tools—Tinsmith's (See Machines—Tinsmith's)

Torches
Diener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Unit Air Conditioners
American Fdry. & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Andes Range & Furnace Corp., Geneva, N. Y.
Armstrong Furnace Co., Columbus, Ohio
Dail Steel Products Co., Lansing, Mich.
Henry Furnace & Fdry. Co., Cleveland, Ohio
Health-Air Systems, Ann Arbor, Mich.
Hess Warming & Ventilating Co., Chicago, Ill.
Lennox Furnace Co., Marshalltown, Iowa
May-Fieberger Co., Newark, Ohio
Meyer Furnace Co., Peoria, Ill.
Midland Furnace Co., Columbus, Ohio
Motor Wheel Corp., Lansing, Mich.
Payne Furnace & Supply Co., Beverly Hills, Calif.
Waterman-Waterbury Co., Minneapolis, Minn.

Vacuum Cleaners—Furnace (See Furnace Cleaners)
Baker Furnace Co., Toledo, Ohio
Brillion Furnace Co., Brillion, Wis.
Densmore & Quinlan Co., Kenosha, Wis.

Ventilators—Ceiling
Hart & Cooley Mfg. Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Reg. & Mfg. Co., Cleveland, Ohio

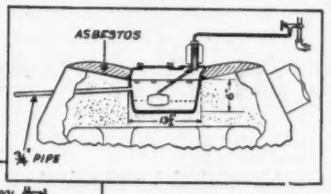
Ventilators—Floor
Aeolus Dickinson, Chicago, Ill.

Ventilators—Roof
Aeolus Dickinson, Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Burt Mfg. Co., Akron, Ohio
Jordan & Co., Paul R., Indianapolis, Ind.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Water Pressure Regulators
Apex Regulator Co., Marshalltown, Iowa

Wood Faces—Warm Air
Auer Register Co., Cleveland, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

COLUMBUS
Automatic Air Conditioner for the Home
HUMIDIFIER



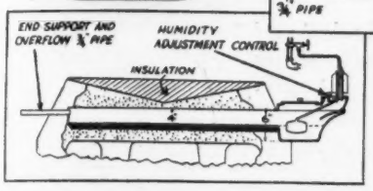


Diagram just above shows the simple manner in which the round model is installed in the bonnet of the furnace.

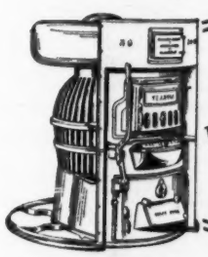
Diagram at the left indicates simple method of installing the long model.

Manufactured by **The Columbus Humidifier Co.**
One East Fifth Avenue, Columbus, Ohio

REGISTERS OF THE HOUR

AUER MAKES A GRILLE AND REGISTER TO MEET EVERY NEED

AUER REGISTER COMPANY
3608 Payne Avenue CLEVELAND, OHIO



Vemois
BETTER BUILT FURNACES HEATERS—RANGES
Let Us Send You Full Details
Mt. Vernon Furnace & Mfg. Co.
Mt. Vernon, Illinois

Only the New WATERBURY SEAMLESS FURNACE

REG. U.S. PAT. OFF. PIPE OR PIPELESS

Is Guaranteed Permanently Gas-Tight

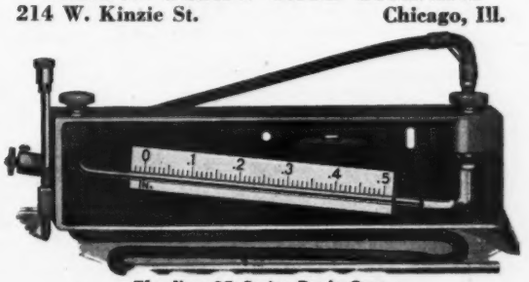
The Waterman-Waterbury Co.
1122 Jackson Street N. E., Minneapolis, Minnesota

Have You ELLISON DRAFT GAGES *The Entering Wedge To Boiler Room Efficiency* *Seen It*

Open Up New Standards

Since 1896 we have had the opportunity of watching the performance of our instruments. The widening circle of users proves that they open up new standards of furnace effectiveness.
This is the Gage Furnace men should use to determine the efficiency of the heating system. It shows precisely how much draft there is at any point tested.

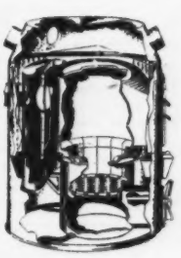
ELLISON DRAFT GAGE COMPANY
214 W. Kinzie St. Chicago, Ill.



The New 35 Series Draft Gage

Write Today for Literature ELLISON DRAFT GAGES *The Entering Wedge To Boiler Room Efficiency* *Ask Us Now About This New Instrument*

Be the Miracle Man in Your Community!



If you're a real furnace man and know how to sell furnaces, you'll more than appreciate the advantages of selling

X-L-ALL
Rugged Steel
Warm Air Furnaces
(Pat. Applied For)

The fact remains that our dealers are selling furnaces—and making money—plenty of it. They look like miracle men as compared with some in the trade.

In the first 10 months of 1931 X-L-ALL furnace sales throughout the nation were 185% of those of 1930! We predict that they will have doubled before the end of the year.

You, too, can prove that there's always a market for a product when it is something that has merit—something that people want. Month after month we've been giving you the reasons here why our furnace is the outstanding heating plant today. If you've missed them, it's a simple matter to mail this coupon. Do it today. You're not obligated.

The Deshler Foundry & Machine Works
140-142 S. East Ave., Deshler, Ohio
Please send me without obligation.....
.....The X-L-ALL Furnace Book
.....The X-L-ALL Dealer Proposition
Name.....
Street.....
City.....

Say you saw it in AMERICAN ARTISAN—Thank you!

Alphabetical List *of* Advertisers

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in alternate issues is marked with an asterisk.

A-C Mfg. Co. 32
Aeolus Dickinson* ....
Agricola Furnace Co., Inc. 33
American Air Filter Co., Inc.* ....
American Brass Co. 30
American Foundry & Furnace Co.* ....
American Furnace Co.* ....
American Machine Products Co.* ....
Andes Range & Furnace Corp. 30
Apex Regulator Co. 32
Armstrong Furnace Co.* ....
Auer Register Co. 39
Automatic Humidifier Co.* ....

Baker Furnace Co.* ....
Barnes Metal Prod. Co.* ....
Berger Bros. Co. 37
Bertsch & Co. 32
Braden Mfg. Co.* ....
Brauer, A. G., Supply Co.* ....
Breuer Elec. Mfg. Co. 33
Brillion Furnace Co.* ....
Brundage Co.* ....
Burt Mfg. Co.* ....

Chicago Perforating Co. 32
Clarm Mechanical Devices Co.* ....
Columbus Humidifier Co. 39
Connors Paint Co., Wm.* ....

Dail Steel Products Co.* ....
Densmore & Quinlan Co.* ....
Deshler Foundry & Machine Works 39
Des Moines Stove Repair Co. 35
Diener Mfg. Co., Geo. W. 33
Dreis & Krump Mfg. Co. 35

Economy Baler Co. 29
Ellison Draft Gage Co. 39
Emerson Electric Mfg. Co.* ....
Enterprise Boiler & Tank Works* ....

Fanner Mfg. Co.* ....
Forest City Foundries Co.* ....

Gehri, A., & Co. 42
General Air Conditioner Co., Inc. 35
General Heating Co.* ....
Globe Iron Roofing & Corrugating Co. 6
Graff Furnace Co. 31
Granite City Steel Co. 3
Grand Rapids Furnace Cleaner Co.* ....

Hall-Neal Furnace Co.* ....
Harrington & King Perf. Co. 37
Hart & Cooley Mfg. Co. 31
Health-Air Systems 29
Henry Furn. & Fdy. Co. 33
Hess Warming & Ventilating Co. 27
Howes Co., S. M.* ....

Independent Air Filter Co.* ....
Independent Reg. & Mfg. Co.* ....
Inland Steel Co.* ....
International Nickel Co.* ....
Interstate Machinery Co.* ....

Jordan & Co., Paul R. 30

Kester Solder Co.* ....
Kleenaire Filter Co.* ....

Lakeside Co. 37
Lastik Products Co., Inc.* ....
Lennox Furnace Co. 5
Levow, David 35
Liberty Foundry Co.* ....

Marshalltown Mfg. Co. 37
May-Fiebeger Co.* ....
McIlvaine Burner Corp.* ....
Menominee Air Washer Co. 30
Meyer & Bro., F. 32
Meyer Furnace Co.* ....
Midland Furnace Co. 42
Milcor Steel Co. Back Cover
Minneapolis-Honeywell Reg. Co.* ....
Modern Heat Regulator Co.* ....
Motor Wheel Corp., Heater Div.* ....
Mt. Vernon Furnace & Mfg. Co. 39

Newport Rolling Mill Co. 7
Niagara Machine & Tool Works 37
Northern Oil Burners, Inc.* ....
Northwestern Stove Repair Co.* ....

Osborn Co., The J. M. & L. A.* ....
Overton, Platte 42

Parker-Kalon Corp. 8
Payne Furnace & Supply Co. 27
Peerless Foundry Co.* ....
Pioneer Heat Regulator Co.* ....
Premier Warm Air Heater Co. 32

Republic Steel Corp.* ....
Revere Copper & Brass, Inc.* ....
Rival Strap Corp. 35
Round Oak Furnace Co. 33
Rybolt Heater Co.* ....
Ryerson & Son, Inc., Jos. T.* ....

Saginaw Salt Products Co.* ....
Sallada Mfg. Co.* ....
St. Louis Tech. Inst.* ....
Schwab Furnace & Mfg. Co.* ....
Silent Automatic Corp.* ....
Standard Asbestos Mfg. Co.* ....
Standard Fdy. & Furn. Co.* ....
Symonds Register Co.* ....

Technical Products Co.* ....
Time-O-Stat Controls, Division Minneapolis-Honeywell Regulator Co.* ....

United States Register Co.* ....

Viking Shear Co. 33

Waterloo Register Co. 31
Waterman-Waterbury Co. 39
Western Steel Products Co. 32
White Mfg. Co.* ....
Whitney Mfg. Co., W. A. 33
Wilson, Grant, Inc. 33
Wise Furnace Co. 29

Yoder Co., The 35
Young Ventilating Co., The* ....

THE BUYERS' DIRECTORY APPEARS ON PAGES 36 AND 38

Classified Advertising

BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddle Company, Marshfield, Wis.

For Sale—Inventor wants someone to promote the manufacture and sale of device for setting furnaces. One man, without helper, can handle heaviest castings alone. Designed to take down radiator on reset jobs, without removing bonnet or pipes. Simple to manufacture. Millions of possible customers. Will sell outright or on royalty basis. Address M-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Tin, plumbing and heating shop, doing good business. Good tools, machinery and stock. Fire proof building. No other shop in town. Must sell on account of old age. Shop won't be for sale long. Address W-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Best sheet metal and furnace business in town of 12,000. Well equipped shop. Very little competition. Wonderful opportunity for right party who thoroughly understands the business. Would not consider selling if other interests didn't necessitate leaving the country. You must look this proposition over to appreciate its value. Priced cheap. Address E-542, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Wanted—Will either buy or operate on shares a well established warm air heating and sheet metal business in central states. Give full information. Address Apartment 5, 219½ North Federal Avenue, Mason City, Iowa. J-543

HELP WANTED

Wanted—Experienced sheet metal and furnace salesman for jobber in middle west. State previous connections and experience. Correspondence strictly confidential. Address H-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Manufacturers' Agents

Wanted to sell our furnace cement, roofing paint and cement and calking compounds. Our consistent trade paper advertising is creating demand. Exclusive territory given with liberal commission. Address C-543, AMERICAN ARTISAN, 139 N. Clark Street, Chicago, Illinois.

Wanted—Experienced furnace salesman. Must be experienced in forced air and gravity heating. Address E-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

SITUATION WANTED

Situation Wanted—By a first class auto radiator repair man. Can rebuild and recore any make. Prefer Illinois or Indiana. Address A. B. Creacy, 115 Merchant Street, Havana, Illinois. M-542

SITUATION WANTED

Situation Wanted—By first class sheet metal worker, qualified in general sheet metal and heating. Would consider reestablishing some shop that has or is about to discontinue for lack of the right cooperation, such as some hardware stores have, or would consider opening shop in locality that so warranted. Illinois preferred. Address P-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

Situation Wanted—By experienced sheet metal and furnace salesman. Can handle anything in the business at the bench or installing. Best of references. Have sold as high as $35,000 a year of furnace business. Address T-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Sales and Advertising Manager

well-known in the industry and to the trade, seeks new connection with manufacturer who is interested in developing air conditioning equipment.

Broad and productive experience in all lines of heating engineering, including adaptation of refrigeration in connection with forced warm air heating systems.

Have designed several air conditioning units, and improvements in warm air furnace construction.

Member A. S. H. & V. E., A. S. M. E. Twelve years with present company.

Address R-543
AMERICAN ARTISAN
139 North Clark Street Chicago, Ill.

Situation Wanted—By all around sheet metal worker. Can handle any branch of the trade such as cornice, skylights, ventilation and warm air heating. Can make estimates and run the shop. Would prefer employment with good hardware company or job shop. Can do any of the work that comes in. Address D-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Wanted—By graduate Mechanical Engineer, with twenty years experience in sheet metal construction and roofing in all their branches, a position with some reliable concern as estimater, pattern cutter, detailer, shop manager, foreman, or all these combined. Good references from past employers, as to character and ability. Married and strictly sober. Address T-542, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—In small town by combination plumber, steam fitter, sheet metal, furnace, metal roofing, and hardware man. Experienced in all these lines. Good character and ability. Married and strictly sober. Michigan preferred. Wish year around position. Address Steam Fitter, 4632 Second Boulevard, Detroit, Michigan. K-543

Situation Wanted—By all around sheet metal worker and furnace man. Can handle anything in the business, and have equipment to set or reset any furnace without helper. Will go anywhere. Address F-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By reliable sheet metal worker. Long general experience in warm air heating, sheet metal work and plumbing. Will go anywhere. Can figure jobs and handle men. Neat and accurate with work. A-1 habits. Address A-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By furnace salesman, traveling Kansas, Missouri and Nebraska for the past 15 years. Thoroughly acquainted with the heating trade and the heating business. Age, 39. Photograph and best of references on request. Address G-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

TOOLS AND MACHINERY

For Sale—A complete line of tinners and plumbing tools. Owing to poor health and old age I must dispose of them. Address L-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Wanted—Four foot Chicago steel brake. Must be cheap. If edges are marred, doesn't make any difference. Address Harry Derrough, 502 North Neil Street, Champaign, Ill. O-543

Wanted—An 8 foot machine for making 4 and 5 inch half round gutters, which will handle 24 gauge iron. Address S-543, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—One Marshalltown Lennox throatless shear, practically new, No. 18. Also one set 20" forming rolls, both for $25. Address Box 141, Auburn, Indiana X-543

BOOKS

Exhaust and Blow Piping, by Hayes—Exhaust and Blow Piping has had an unusually big demand. A fresh supply is now off the press and is in our hands for immediate delivery. It has an invaluable treatise on the planning, cost, estimation and installation of fan piping in all its branches, giving all necessary guidance in fan work blower and separator construction. 159 pages, 5x8. 51 figures. Cloth. $2.00. Order from Book Department, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Illinois.

Here are the two books that most sheet metal workers and contractors classify as the most complete books on Sheet Metal Pattern Cutting. The Universal Sheet Metal Pattern Cutter, Vol. 1, deals with every phase of inside work, including Heating, Ventilating, Blower and Exhaust Piping Connections, Marine Sheet Metal Work, Automobile Sheet Metal Work, Machinery and Belt Guards, etc., Mensuration applied to Sheet Metal Work, etc., with many features of construction and Labor-Saving Methods also given in detail.

Vol. 2 deals with every form of Outside and Architectural Sheet Metal Work. A treatise on Drawing, Full Size Detailing and Lettering, Construction of Cornices, Skylights, Molding, Copings, Electrically Illuminated Signs, etc.

Cloth bound, 400 pages each volume. Price, $7.50 per volume, postpaid. Order from Book Department. AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

What Are You Looking For?

Get in the habit of reading these pages as a convenient means of supplying your special wants.

SUCCESS HEATED MIDLAND FURNACES

There Is
No Substitute for
QUALITY.

SUCCESS HEATERS ◆ EL CAPITAN FURNACES

MIDLAND FURNACE CO.
COLUMBUS, OHIO DES MOINES, IOWA

SILENTAIR
AIR CONDITIONING UNITS

The tremendous success of SILENTAIR AIR CONDITIONING UNITS results, in no small measure, from the fact that they are MATCHED UNITS. Easily installed with any warm air furnace they bring splendid profit to dealers and comfort and economy to home owners. Write for descriptive literature.

A. GEHRI & CO., INC.
Factory & Main Office - - - - Tacoma, Washington
Eastern Sales Office & Warehouse, Baltimore Trust Bldg., Baltimore

Have Your Trunk Ducts and Branches Designed by Overton for 40c Per Warm Air Grille!

Dealers can save from $50.00 to $100.00 on each job in material and labor alone, through using scientifically designed trunk lines and branches. The time saved in an attempt to balance a poorly designed system will more than pay for the cost of my engineering service.

NOTE THESE PRICES!

RESIDENCES

Up to and including 5 rooms	$1.10 per room
5 to 9 rooms inclusive	$1.00 per room
10 to 15 rooms inclusive	$0.85 per room
16 to 20 rooms inclusive	$0.80 per room
21 rooms and over	$0.75 per room

CHURCHES

Up to and including 50,000 cu. ft. gross content	$0.12 per 1,000 cu. ft.
50,000 cu. ft. and over	$0.10 per cu. ft.

SCHOOLS

20,000 to 50,000 cu. ft.	$0.30 per 1,000 cu ft.
50,000 to 70,000 cu. ft.	$0.25 per 1,000 cu. ft.
70,000 to 100,000 cu. ft.	$0.20 per 1,000 cu. ft.
100,000 cu. ft. and over	$0.15 per 1,000 cu. ft.

FACTORIES, GARAGES

Duct systems	$0.12 per 1,000 cu. ft. gross content
Unit heater systems	$0.10 per 1,000 cu. ft. gross content

SPECIAL NOTE

Where heating systems include filters, washers, temperature control as EXTRA EQUIPMENT—add 20 per cent to listed prices.

Where filters, washers, temperature controls are A PART OF THE HEATER AND ARE UNDER ONE CASING—listed prices apply.

For complete working plans detailing all trunk lines in ½-inch scale and showing details of elbows, stacks, branches, sections, cross sections of walls—add 50 per cent to list prices.

Add $0.01 per square foot of direct radiation for combination systems.

PLATTE OVERTON *Consulting Engineer* **2100 City Hall Square Bldg., Chicago**

IR CON-
sure, from
Easily in-
splendid
to home

ton
., Baltimore

r

OTE

s include
ture con-
PMENT
to listed

rs, tem-
A PART
ND ARE
G—listed

g plans
s in ½-
g details
hes, sec-
walls—
prices.
e foot of
nbination

icago

American Artisan

THE WARM AIR HEATING AND SHEET METAL JOURNAL

FOUNDED 1880

139 NORTH CLARK STREET
CHICAGO

Merchandising Again Will Be the Keynote!

Letter upon letter (all in our files for your examination) comes to us from subscribers in every section of the United States thanking us for the real help we are giving them in merchandising and selling.

That is Why Merchandising Again Will Be the Keynote

of our Warm Air Heating and Sheet Metal Annual which will be mailed to the trade on December 21st—and continue to be our plan through 1932.

This by no means indicates that the technical and business ends of our great industry will be side-tracked. Profusely diagramed and illustrated technical articles are being prepared by recognized authorities; photographs and stories of actual installations in heating, ventilation, air conditioning, general and architectural sheet metal work have been gathered for months by our editors and are now being whipped into shape.

BUYERS—contractors and jobbers—find our Annuals of real assistance in determining "fashions" and sources of supply for the coming year—for warm air heating and air conditioning (automatic, coal, gas and oil fired) as well as sheet metal equipment and supplies.

LEADING MANUFACTURERS realize this; and year after year display their products prominently in our advertising pages.

It will pay you to join this group of go-getters who are determined to keep the sheet metal and warm air heating industry, an industry of stability and real progress. WRITE FOR DETAILS TODAY!

AMERICAN ARTISAN

Take a look at your CEILING

. . . and tell your Neighbors to do likewise!

Five samples from the Milcor line of stamped metal ceiling designs. Hundreds of standard patterns.

Get the *outside* slant on *your* store. Walk in your front door. What's your impression of *your* place of business?

Are your ceilings and walls clean . . . bright . . . free from cracks? If they aren't you can't expect people to *like* to come to your store.

Metal Ceilings by *Milcor* will redecorate your place attractively . . . economically . . . quickly. Gone will be the handicap of cracked and falling plaster . . . Fire risk is reduced. The invisible *Milcor* joint makes a continuous area of beautiful design.

Then go to your neighboring merchants. See how *their* ceilings are . . . and when you find a store that needs redecorating, suggest *Milcor* Metal Ceilings and let us help you figure the job to get it at a profit.

Do it *now*, mister. He who acts fast is the "bird" who gets the good fat worm. Send for complete details . . . *now!*

MILCOR STEEL COMPANY

MILWAUKEE, WIS., 4117 W. Burnham St. CANTON, OHIO
Chicago, Ill. Kansas City, Mo. LaCrosse, Wis.

Sales Offices: New York, at 100 E. 42nd Street; Boston, Mass., at 131 Federal Street; Atlanta, Ga., at 207 Bona Allen Building; Minneapolis, Minn., at 602-2nd Avenue, So.; Little Rock, Ark., at 104 W. Markham Street

Copper Alloy Steel

MILCOR PRODUCTS

Save with Steel